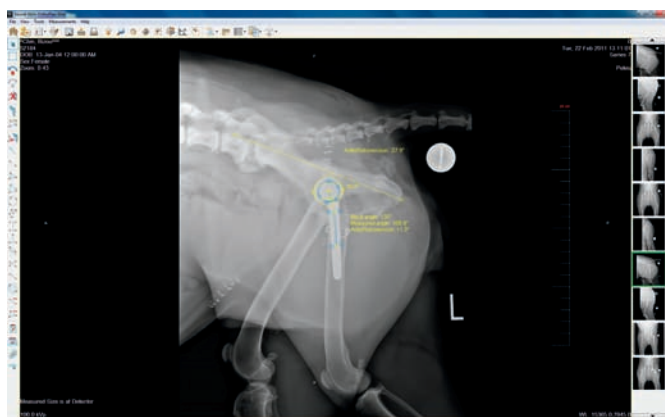


The
Standard
of Care for
Surgical
Planning



Orthoplan[®] elite

User Manual



YOUR IMAGE IS OUR BUSINESS.



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Orthoplan Elite® User Guide

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 Technical Support 167

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Prologue

About this Guide

This section describes various conventions and visual cues that are used throughout this guide.

Installation Drive and Folder

The Installation Wizard selects the drive on which the operating system is installed as the default installation drive for the Sound-Eklin® Orthoplan Elite® application. Thus, if your operating system is installed on drive C:\, then your default destination drive will be C:\.

The examples provided throughout this guide assume that the application is installed under the default path, C:\Program Files\Merge\OrthoCase.

Visual Cues

Throughout this guide, the following conventions and visual cues are used:

- Words shown in large, boldface text such as **Exit** indicate application functions that you can click with the mouse (e.g., buttons, tools, items in dropdown lists).
- Words shown in Times New Roman, boldface text such as **Administrator** indicate characters that you must type exactly as they appear (i.e., if you are instructed to log on as **Administrator**, you must type the characters exactly as they are printed).
- Words shown in uppercase such as ENTER indicate keys on the keyboard that you press. If several keys appear together separated by plus signs (e.g., CTRL+ALT+DEL), it means that you should press all three keys simultaneously.
- Words shown in italics are used for emphasis.
- Words shown in `courier` font indicate operating system responses.

Notes, Cautions, and Warnings



Notes are used to indicate information that may be helpful or of special interest.



Caution messages indicate procedures which, if not observed, could result in loss of data or damage to the equipment. Do not proceed beyond a CAUTION message until the indicated conditions are fully understood and met.



Warning messages indicate procedures which, if not observed, could result in personal injury. Do not proceed beyond a WARNING message until the indicated conditions are fully understood and met. Customer Support If you require assistance, please contact Customer Support: 800.819.5538.

Chapter 1: Installation

This guide describes how to install the Sound-Eklin® Orthoplan Elite® application.

It is intended to be used by service personnel who have a working knowledge of the Microsoft® Windows® operating systems. Please consult the appropriate Microsoft documentation before using this guide if you are not familiar with the Microsoft Windows operating systems.

Screen Captures

This guide uses screen captures to help illustrate various steps and procedures. The screen captures are used as examples only and may differ somewhat from what you see on your monitor.



The Sound-Eklin® Orthoplan Elite® application allows for regulatory compliance, such as the Health Insurance Portability and Accountability Act (HIPAA), by logging users' activities on the workstation. For further details, please contact your System Administrator or "Customer Support" on page 167.

Supported Operating Systems

You can install the Sound-Eklin® Orthoplan Elite® application on the following Microsoft Windows English (US) 32-bit operating systems:

- Windows XP Professional with Service Pack 3
- Windows Vista® Enterprise with Service Pack 1
- Windows Vista Business with Service Pack 1
- Windows 7 Professional
- Windows 7 Ultimate

Chapter 1: Installation *(continued)*

Workstation Requirements

The application runs on a workstation that normally consists of a personal computer, keyboard, mouse and one monitor. You can use a two-button mouse, a three-button mouse or a wheel mouse.

Workstation's hardware requirements.

Component	Recommended Minimum Requirement
Monitor	1280x1024 color
Processor	Intel® Pentium® 4 2 gigahertz or faster
Hard Drive	40 gigabytes
Memory	2 gigabytes



If you are using the Windows 7 operating system, make sure your video card supports Windows Display Driver Model (WDDM) 1.1 or later.

When using the Sound-Eklin® Orthoplan Elite® application with a wide screen monitor, ensure you preserve the aspect ratio when changing the display settings. Otherwise, images may appear stretched or distorted.

The Sound-Eklin® Orthoplan Elite® application does not support 10-bit high resolution monitors.



Use only workstations that have the proper electrical certification.

Chapter 1: Installation *(continued)*

Precautions

The precautions described in this section will help ensure that you do not lose any data from the workstation.

Editing Files

Some of the procedures in this guide instruct you to edit files. We highly recommend that you use the MS-DOS editor or Notepad to edit files. The use of other text editors such as WordPad can cause unexpected errors by the way it formats the file. If a file has already been edited using some other text editor, open it using the MS-DOS editor and save it to replace any incorrectly formatted characters.



Do not use WordPad to edit text files.

Date and Number Format

The application uses the date format and number format specified by your workstation's regional settings. You should check your regional settings to ensure that your workstation uses the most common date and number format used in your region to avoid confusion. We also recommend that you set the workstation to recognize four-digit years.

To check your workstation's regional settings

1. In the Taskbar, click **Start, Settings, Control Panel**.
2. Double-click **Regional and Language Options**.
3. Ensure that you have selected the most common language, number and date settings used in your region. The date style should include a four-digit year.
4. If you have made any changes, restart your operating system.

Preventing Computer Viruses

Computer viruses can prevent the application from working properly.



We recommend that you install anti-virus software on the workstation.

Chapter 2: Installing the Application

This chapter describes how to install the Sound-Eklin® Orthoplan Elite® 3.4 application for the first time. This chapter also describes how to uninstall the application. You can install the application in one of the following ways:

- As a standalone application.
- As a plug-in from iConnect Access.

After you install all the desired software, license the Sound-Eklin® Orthoplan Elite® application (see Chapter 3, “Licensing the Application”).



If you plan to launch the Sound-Eklin® Orthoplan Elite® application from iConnect Access, make sure the Sound-Eklin® Orthoplan Elite® application is already configured as an external application on the iConnect Access Web server.

Installing the Sound-Eklin® Orthoplan Elite® Application

This section describes how to install the Sound-Eklin® Orthoplan Elite® application. This procedure assumes you are installing the application in the default installation directory, C:\Program Files\Merge\OrthoCase.



If you plan to launch the Sound-Eklin® Orthoplan Elite® application from iConnect Access, install the Sound-Eklin® Orthoplan Elite® plug-in (see “To install the application from an iConnect Access Web server”).

You must complete any outstanding Windows updates before you continue with the installation. Do not install any new Windows updates until the installation is complete.

Please ensure the Windows Firewall/Internet Connection Sharing (ICS) server is running when installing the application or else the installer displays the following message “Cannot connect to Window Firewall”, which prevents the system from handling upgrades.

To install the application from the CD

1. Log on as Administrator or a user with administrative privileges.
2. Shut down all other applications running on the workstation, including any third-party antivirus or utility applications, such as Norton AntiVirus®.
3. Insert the Sound-Eklin® Orthoplan Elite® Software CD in the CD-ROM drive.
4. If you do not have an auto-run CD-ROM drive, double-click **My Computer**, double-click the drive letter associated with the CD-ROM (e.g., D:) then double-click **startpage.exe**.

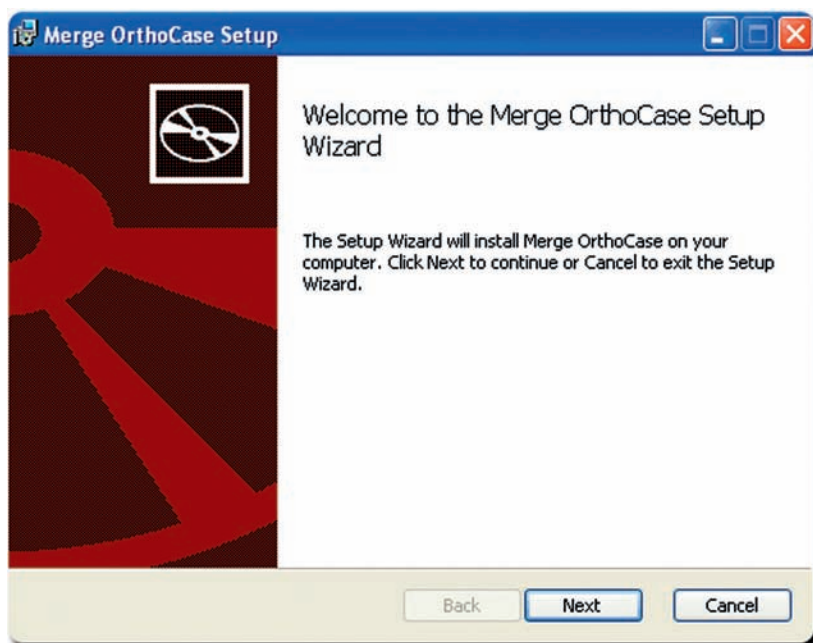
Chapter 2: Installing the Application

Installing the Sound-Eklin® Orthoplan Elite® Application (*continued*)

5. Do one of the following:
 - If you are installing the standalone version of the application, click **Install Sound-Eklin® Orthoplan Elite® Standalone**.
 - If you are installing the plug-in version of the application, click **Install Sound-Eklin® Orthoplan Elite® Plug-In**.
6. When the Installation Wizard displays the confirmation message to install the application, click **OK**.



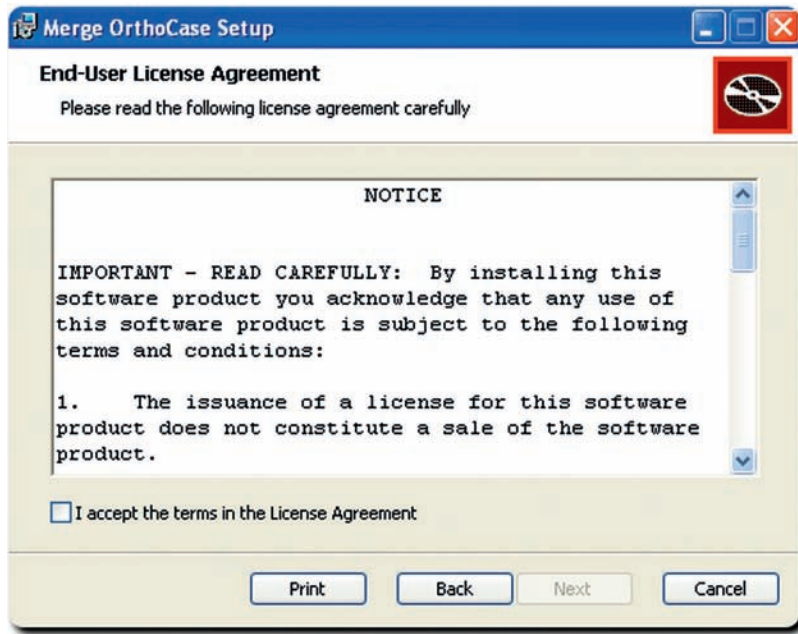
7. If you are prompted to install the following software, follow the on-screen installation instructions to install them:
 - Microsoft .NET Framework 2.0
 - Microsoft Visual J# 2.0 Redistributable Package – SE
 - Microsoft Windows Imaging Component 1.0
 - Microsoft Report Viewer Redistributable 2005
8. In the Welcome dialog box, click **Next**.



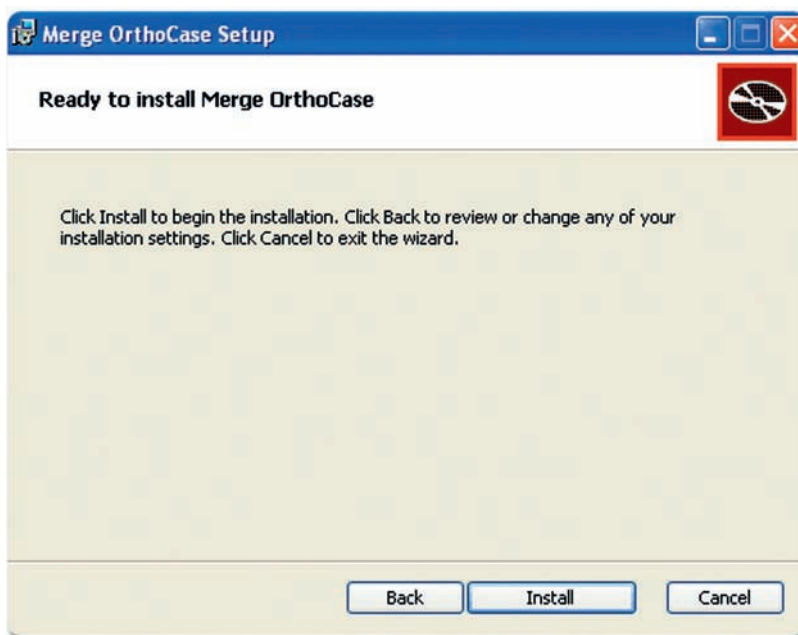
Chapter 2: Installing the Application

Installing the Sound-Eklin® Orthoplan Elite® Application (*continued*)

9. In the End User License Agreement dialog box, read the notice carefully, then select the “I Accept the Terms in the License Agreement” checkbox to accept the license agreement.



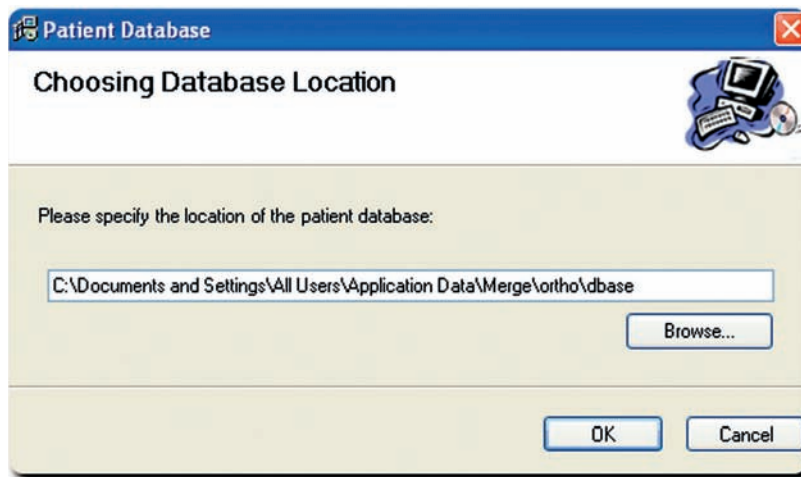
10. Click Next.
11. In the Destination Folder dialog box, do the following:
 - We recommend you install the application in the default folder. To select a different location, click **Change**. Navigate to the desired directory then click **OK**.
 - Click **Next**.
12. Click **Install** to begin installing the application.



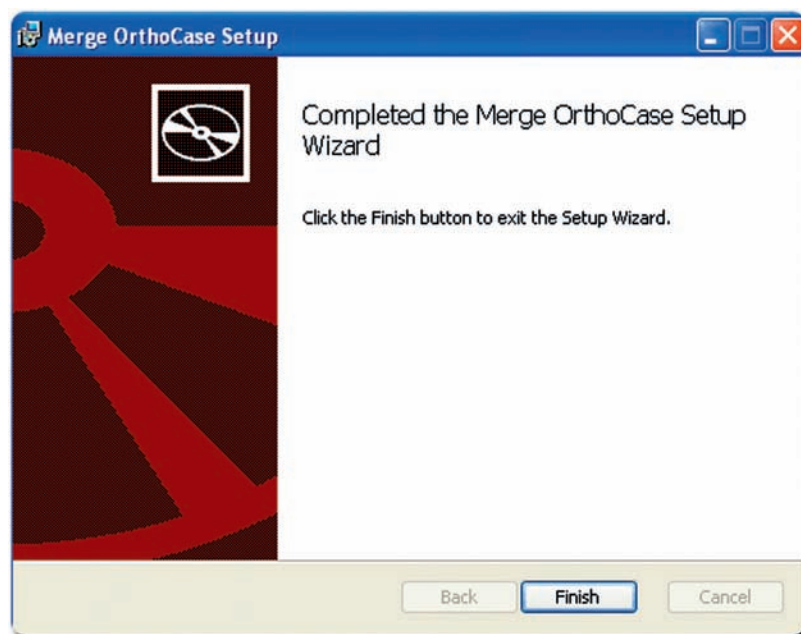
Chapter 2: Installing the Application

Installing the Sound-Eklin® Orthoplan Elite® Application (*continued*)

13. If you are installing the Sound-Eklin® Orthoplan Elite® Plug-in application, proceed to **Step 16**; otherwise, continue to **Step 14**
14. In the Choosing Database Location dialog box, the system displays the default destination folder to install the patient database. Do the following:
 - To select a different database location, click **Browse**. Navigate to the desired directory then click **OK**.
 - In the Choosing Database Location dialog box, click **OK**.



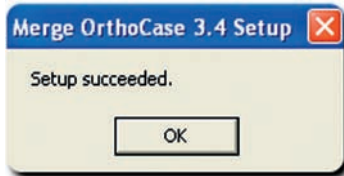
15. If the Installation Wizards prompts you to confirm the creation of the database folder, click **Yes**.
16. When the installation is complete, click **Finish**.



Chapter 2: Installing the Application

Installing the Sound-Eklin® Orthoplan Elite® Application (*continued*)

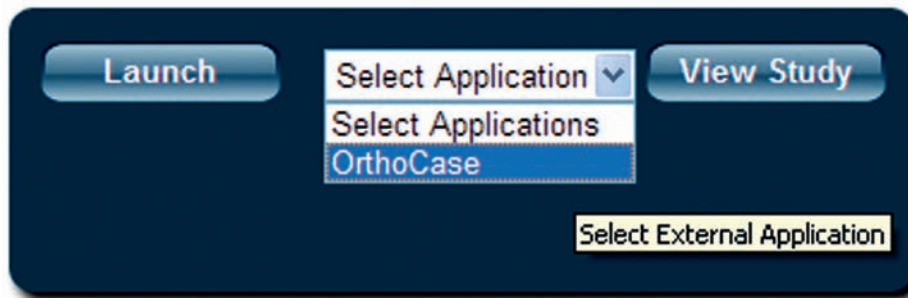
17. In the Setup succeeded dialog box, click OK.



18. License the Sound-Eklin® Orthoplan Elite® application (see "Licensing the Application" on page 10.)

To install the application from an iConnect Access Web server

1. Log on to the iConnect Access application.
2. Select a Study in the Studies window.
3. From the Select Applications drop down window, select OrthoCase.
4. Click Launch.



5. The application displays a message containing a link to a download page.
6. Click the download page link. A separate window opens containing a link to the Merge OrthoCase installer.
7. Follow the on-screen instructions to install the Sound-Eklin® Orthoplan Elite® application. For details, refer to *Steps 6 through 17*.
8. Add the Sound-Eklin® Orthoplan Elite® application to the list of Connected external applications. Refer to section "Associating External Applications with a Role" of the *iConnect Access Administrator's Guide*.

Chapter 2: Installing the Application

Installing the Sound-Eklin® Orthoplan Elite® Application (*continued*)

Uninstalling the Application

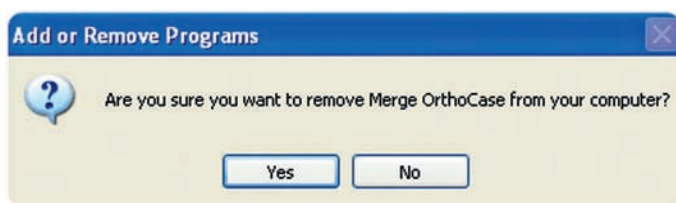
This section describes how to remove the Sound-Eklin® Orthoplan Elite® application from your workstation.



Before you remove the application, make sure you backup all necessary files including the application's database.

To uninstall the application

1. Log on as Administrator.
2. Open the Control Panel.
3. Double-click **Add or Remove Programs**.
4. In the list of currently installed programs, select the Sound-Eklin® Orthoplan Elite® application.
5. Click **Remove**.



6. Click **Yes** to confirm you want to remove the application.



7. In the Patient Database dialog box, click **Yes** if you want to save a copy of the patient database to upgrade the application; otherwise, click **No**.

Chapter 3: Licensing the Application

Before you can run the Sound-Eklin® Orthoplan Elite® application, you need to license the application. This chapter describes how to obtain and install a Sound-Eklin® Orthoplan Elite® license.



If you plan to launch the Sound-Eklin® Orthoplan Elite® application from iConnect Access, request the iConnect Access with Sound-Eklin® Orthoplan Elite® license. Contact Customer Support for help obtaining this license (see “Customer Support” on page 167.) This license is installed on the iConnect Access Web server. Refer to the iConnect Access Installation Guide.

Obtaining a License Key

This section describes how to obtain a license key from Sound-Eklin®.



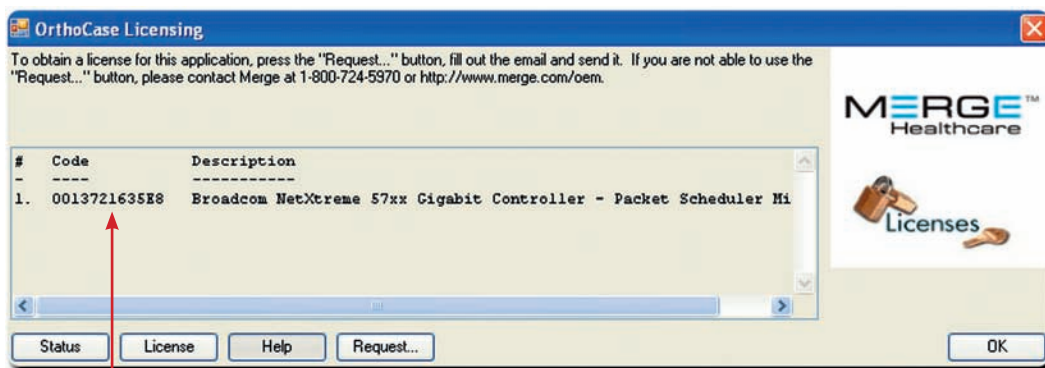
Make sure you finish configuring your network, including the TCP/IP settings, before you license the application. If the license is bound to the network, you will void the license if you change the network configuration or reinstall the application after installing the license.

If you are installing the application on a workstation that has a dedicated network connection, make sure your network cable is plugged into the workstation and your network configuration is complete.

If you are licensing the application on a machine that may not always be connected to the network (e.g., laptop), you must unplug your network cable before you obtain your Server Code. Once you install your license key, you can plug in your network cable. You can start the application with or without a network connection.

To obtain a license key

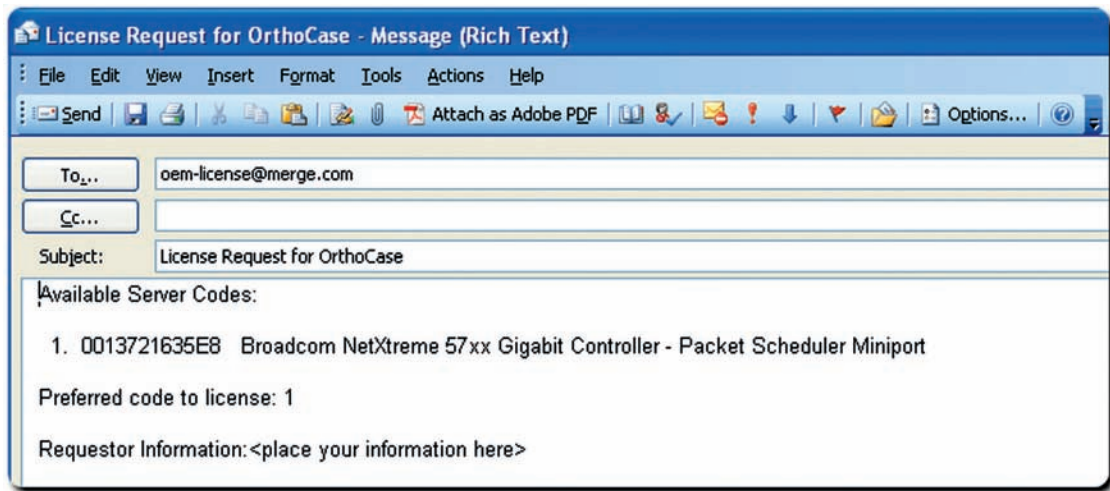
1. Log on as Administrator or a user with administrative privileges.
2. If you are licensing the application on a machine that may not always be connected to the network (e.g., laptop), unplug your network cable.
3. Open the Sound-Eklin® Orthoplan Elite® application.
4. The application displays the Sound-Eklin® Orthoplan Elite® Licensing dialog box. Click **Help** to display the list of available server codes for your workstation.



The list of available Server Codes

Chapter 3: Licensing the Application *(continued)*

5. Click **Request** to e-mail your license request information to Sound-Eklin® using your default e-mail application.



6. Alternatively, you can request a license via the Web interface or by contacting Sound-Eklin® using one of the following numbers:
 - In North America, call toll-free 800.819.5538
 - International, 1.760.918.9626.
7. The table below lists the information you should provide when requesting a license.

Contact Information	Your name, phone number and email address.
Site Information	Hospital name and address.
PO Number	Purchase Order Number.
Product Name	Sound-Eklin® OrthoPlan Elite.

8. Sound-Eklin® provides you with a license key file for the application, (i.e., 1234LicOut.bin).

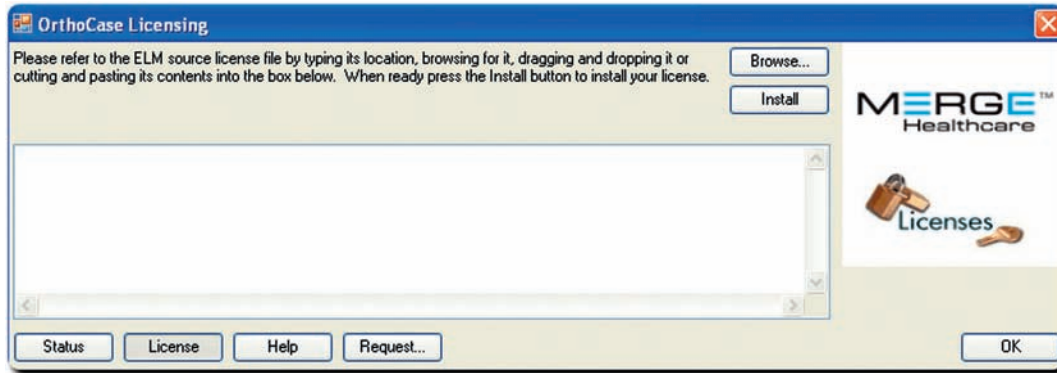
Chapter 3: Licensing the Application *(continued)*

Installing the License

This section describes how to install your Sound-Eklin® Orthoplan Elite® license.

To install the license key file

1. Save the license key file to a convenient location (i.e., Desktop).
2. Open the Sound-Eklin® Orthoplan Elite® application.
3. The application displays the Sound-Eklin® Orthoplan Elite® Licensing dialog box. Click **License** then do the following:
 - Click **Browse**.
 - Navigate to the license key file you saved in Step 1, then double-click the license key file.
 - Click **Install**.



4. When the application describes how many features are licensed, click **OK**.
5. In the Sound-Eklin® Orthoplan Elite® Licensing dialog box, click **OK**.
6. Click **OK** to complete the licensing procedure and launch the application.

Chapter 4: Configuring the Application

This chapter describes how to configure the database size, auto deletion settings and setting preferences.

Managing the Database

The Auto-Deletion feature automatically deletes patient studies from the local image database at a specified regular interval. This ensures that the local image database does not run out of disk space, and that it has sufficient capacity to receive incoming studies.

The current database usage is displayed at the bottom of the Database Settings tab. It is also displayed at the bottom of the Study Selection window of the application. You can configure the maximum database size.



As the database nears 100% full, the disk partition can reach its capacity as well. If this scenario occurs, the database might not receive all the incoming studies.



You must log on as Administrator to configure the database auto-deletion settings.

To configure the Auto-Deletion settings

1. In the Study Selection Window, click the **Tools** menu and select Auto Deletion Configuration.

Auto Deletion Settings

Maximum database size (GB):

Start deleting when local image cache is % full

Stop deleting when local image cache is % full

Except, do not delete studies that:

☐ Were received in the last days

Chapter 4: Configuring the Application

Managing the Database (*continued*)

2. Configure the following settings:
 - In the “Maximum database size (GB)” field, specify the maximum database size in gigabytes (GB). The default maximum database size is 4 gigabytes.
 - From the “Start deleting when local image cache is” dropdown list, select a percentage that indicates how full you want the database to be (e.g., 90%) when the system starts to automatically delete studies from the database.
 - From the “Stop deleting when local image cache is” dropdown list, select a percentage that indicates how full you want the database to be (e.g., 80%) when the system stops automatically deleting studies from the database.
 - If you want the Auto-Deletion feature to not delete recent studies received during a specified number of days, select the “Were received in the last” checkbox and enter the number of days.
3. Click OK.

Setting Preferences

The default magnification correction is set through preferences.

To configure the unit of measurement

1. Open the install.properties file at run time.
2. Specify the unit of measurement for the sphere’s diameter. The property is “openeyes/application/opus/ui/imagemagnification/labelOneInchUsingMm = true”.
3. The options for the sphere’s diameter, for example, 24.5 mm and 25 mm, display.



If setting openeyes/application/opus/ui/imagemagnification/labelOneInchUsingMm = false, the options for the sphere’s diameter display as 1 inch and 25 mm. To configure the default magnification correction

1. Open the install.properties file at run time.
2. Add the following line “openeyes/application/opus/MagnificationFactor = mag_factor_integer”.
3. Specify the percentage for the mag_factor_integer. For example, if you want to change the value to 20%, enter “openeyes/application/opus/MagnificationFactor = 20”.



The default magnification correction has changed from 15% to 10%.

Chapter 5: Orthocase Overview

This user's guide is designed to introduce you to the main Sound-Eklin® Orthoplan Elite® application functions. Each chapter provides easy, step-by-step instructions to help you use the application. Wherever possible, the illustrations reflect the application's standard configurations.

About the Application

The Sound-Eklin® Orthoplan Elite® application is an orthopaedic planning software that supports multidisciplinary orthopaedic areas such as total joint, spine, and trauma measurements. It features a large implant database with templates from major implant manufacturers. It also provides advanced orthopaedic tools such as image stitching, automatic hip templating and automatic measurements. Some advanced tools are optional and indicated as so in the appropriate sections of this document.

The Sound-Eklin® Orthoplan Elite® application provides stitching capability through the Sound-Eklin® Orthoplan Elite® X-Stitch module. For complete details, refer to the Sound-Eklin® Orthoplan Elite® X-Stitch Console User's Guide.



The application presents patient studies on a monitor in various ways. It does not interpret image data to generate a diagnosis. Diagnostic interpretation is the user's responsibility.



The Sound-Eklin® Orthoplan Elite® application supports the review of multi-slice datasets (e.g., CT, MRI); however, it does not support the review of multi-frame datasets.

We recommend that you use a spherical fiducial marker when you acquire images for use with the Sound-Eklin® Orthoplan Elite® application. Contact Customer Support for more information (see "Customer Support" on page 167.)

The application allows for compliance with HIPAA (Health Insurance Portability and Accountability Act) by logging users' activities on the workstation. Please contact your System Administrator or Customer Service Specialist for further details.

Chapter 5: Orthocase Overview *(continued)*

Understanding Standalone and Plug-in Mode

In standalone mode, the application provides a study list (i.e., the Study Selection window) that displays the patient studies contained in the selected data source. You select and load studies from the provided study list into the Main Review window (see “Selecting Patient Studies” on page 21.)

When installed as a clinical plug-in, the application does not provide a study list. You can use the default study list provided by the host (e.g., the C4 Cockpit user interface or a third-party study list). When you select a patient study from your host’s study list, the application starts and loads the selected patient study directly into the Main Review window. For details on loading patient studies, consult the appropriate documentation for the study list you are using.



If you are using the application as a clinical plug-in, some Study List related options may not be available in the Main Review window.

Indications for Use The Sound-Eklin® Orthoplan Elite® application is intended for the following use:

- Two and three dimensional image review, manipulation, analysis and therapy planning capabilities that support image management display needs in the medical environment from multiple locations within and outside the hospital.
- Productivity-Enhancing Second Console Workstations – Workstations designed to perform automated, routine tasks such as image review, printing and archiving as well as post processing capabilities that enable special services for referring physicians.
- Diagnostic Review Workstations – Workstations designed to assist radiologists and surgeons in conducting primary diagnostic review and planning through flexible and 3 Chapter 1 interactive manipulation of multi-modality softcopy images. This includes the use of prosthetic template overlays.
- Physician’s Review Workstations – Workstations designed to give easy and economic access to multi-modality softcopy images in multiple locations within and outside the hospital. (e.g. teleconferencing, teleradiology etc.).

Safety Precautions

This section contains a list of safety precautions that you must be aware of when using the Sound-Eklin® Orthoplan Elite® application.

Repetitive Strain Injury

As with all computer systems, there is a risk of repetitive strain injury if the workstation is used excessively. Repetitive strain injury can include symptoms such as eyestrain, backache, and so on.



Excessive use of the workstation may result in repetitive strain injury.

Chapter 5: Orthocase Overview

Safety Precautions (*continued*)

Lossy Compressed Images

It is possible to misinterpret images that are lossy compressed due to the loss of information from the image. To avoid misinterpretation, the application labels all images that are lossy compressed.



Lossy compressed images are subject to misinterpretation due to information loss. Lossy compressed images must not be used for primary diagnostic interpretation unless approved for use.

Date and Number Format

The application uses the date format and number format specified by your workstation's regional settings. You should check your regional settings to ensure that your workstation uses the most common date and number format used in your region to avoid confusion. We also recommend that you set the workstation to recognize four-digit years.

To check your workstation's regional settings

1. In the Taskbar, click **Start, Settings, Control Panel**.
2. Double-click **Regional and Language Options**.
3. Ensure that you have selected the most common language, number, and date settings used in your region. The date style should include a four-digit year.
4. If you have made any changes, restart your operating system.

Power and Hardware Failure

Due to uncontrollable events such as power and hardware failure, the workstation must not be the only source of image data for diagnosis. Image data must be available from other sources such as scanner consoles, archives, and/or films.



The workstation must not be the only source of diagnostic image data.

Image data can be lost if the workstation is shut off abruptly while a study is being transferred to the hard drive (e.g., there is a power failure or the workstation is accidentally unplugged). The application may display the message "No Image - check manual" when you load the study for review. In this case, you must delete the study and transfer it again.



We recommend that you install an Uninterruptable Power Supply (UPS) to support the workstation in the event of power failure.

Chapter 5: Orthocase Overview

Safety Precautions (*continued*)

Magnetic Interference

The images displayed on the workstation's monitor(s) can be distorted by strong magnetic fields; therefore, the workstation should be positioned outside the 5 Gauss (0.5 mT) magnetic fringe field.



Position the workstation outside the 5 Gauss (0.5 mT) magnetic fringe field.

Computer Virus Protection

Computer viruses can prevent the application from working properly. We recommend you protect the workstation with anti-virus software. Contact your System Administrator for further details.



We recommend that you install anti-virus software on your workstation. Customer Support For applications support, please contact Customer Support:

- In North America, call toll-free, 800.819.5538

Chapter 6: Getting Started

This chapter briefly describes how to start the application and load a patient study into the Main Review window. It also describes how to use the online help system, and how to exit the application.

Starting the Application

Use the following procedure to start the application and load a patient study for review.

Complete details on how to use the Study Selection window are provided in Chapter 2.

To start the application

1. Start the workstation.
2. When you are prompted to log on, press CTRL+ALT+DEL.
3. In the Enter Network Password dialog box, type your user name and password.
4. Click **OK**.
5. To open the application, do one of the following:
 - In the Taskbar, click **Start, Programs, Merge, OrthoCase**.
 - On the Desktop, double-click the **Sound-Eklin® Orthoplan Elite®** icon.
6. Double-click a patient's name to select and load the study for review.
7. The application loads the selected study into the Main Review window.

Using the Help System

The help system provides quick access to user instructions.

To use the online help

1. From the Help menu, click **Contents**.
2. The application displays the online help in a separate window.
3. Use the following features to navigate the help system and find the required topics:
 - Click **Contents** to display a list of topics available, then click the topic you want to view.
 - Click **Index** to display a list of keywords from which you can select a topic. Type in the first few letters of the keyword you are looking for, then double-click the keyword. This is often the easiest way to find a topic.
 - Click **Search** to find all topics that contain a keyword. Type the keyword you want to find, click **Go!**, then click the desired topic in the list displayed.
 - Click **Back** to return to the last topic viewed.

Chapter 6: Getting Started *(continued)*

Using the About Box

The About box displays the Sound-Eklin® Orthoplan Elite® program version and lists the licenses installed on your application.

If you have installed additional components to the Sound-Eklin® Orthoplan Elite® application (e.g., the Sound-Eklin® Orthoplan Elite® X-Stitch module and the Sound-Eklin® OrthoTemplates), you can update your license from the About box.

To access version and license information

1. From the Help menu, click **About**.
2. The application displays the version number, as well as the appropriate copyright and license information.
3. Click **OK** to close the About box.

To update your license

1. From the Help menu, click **About**.
2. Click **License**.
3. In the License key field, enter the license key exactly as it was provided to you by Sound-Eklin®. If possible, use copy-and-paste to avoid typing errors.
4. Click **OK**.
5. Click **OK** to close the About box.

Exiting the Application

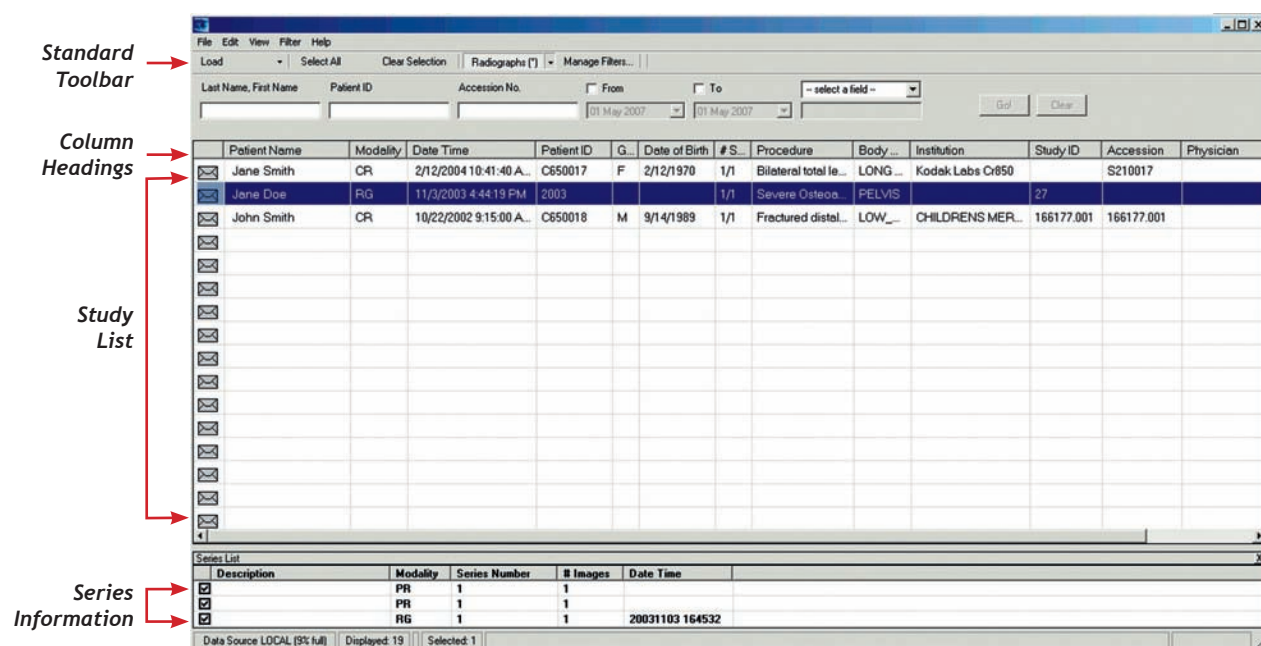
This section describes how to exit the Sound-Eklin® Orthoplan Elite® application. To exit the application

1. From the File menu, click **Exit**.
2. When the application asks if you really want to quit, click **Yes**.
3. The application closes and returns you to the desktop.

Chapter 7: Selecting Patient Studies

This chapter describes how to select patient studies for review and perform various other study management functions such as deleting and transferring patient studies.

The application uses the Study Selection window to display the patient studies contained in the selected data source. The local data source is the workstation's hard drive. Acquisition devices can be configured during installation to automatically transfer studies to the workstation's hard drive.



Accessing the Study Selection Window

When you first start the application, it displays the Study Selection window automatically. This section describes how to return to the Study Selection window during a review session (i.e., from the Main Review window).

To access the Study Selection window during a review session

1. Do one of the following:



- From the File menu, click **Return to Study List**.
- In the Review toolbar, click the **Open Study** button or press **CTRL+L**.

2. The application displays the Study Selection window. The functionalities of the window are described later in this chapter.



If you have made any changes to the image parameter settings, the application asks if you wish to save your work (see “Saving, Loading and Resetting Image Display Parameters” on page 105).

Chapter 7: Selecting Patient Studies *(continued)*

Study List Columns

The Study List is the main element of the Study Selection window. The columns in the Study List provide the patient study and series information described in Table 7.1. You can choose to hide specific columns (see “Configuring Study List Columns” on page 40) or manually resize columns (see “Resizing Study List Columns” on page 40).

Table 7.1 — Study List Columns

Column	Description
Patient Name	The patient’s name
Modality	The source modality of the study.
Date Time	The date and time the study was created. The date format is determined by the workstation’s regional settings. To check the regional settings, see “Date and Number Format” on page 3.
Patient ID	The patient’s identification number.
Gender	The gender of the patient (i.e., “M” for male, “F” for female).
Date of Birth	The birthdate of the patient (mm/dd/yyyy). The date format is determined by the workstation’s regional settings. To check the regional settings, see “Date and Number Format” on page 3.
#Series/ Images	The total number of series (i.e., acquisitions) and images in the study.
Procedure	The protocol used to acquire the study, for example, a Post Fossa acquisition.
Body Part	The body part (e.g., chest) of the patient study.
Institution	The name of the institution where the study was created.
Study ID	The study identification number.
Accession	The number of the exam. It is used by the RIS system to track the radiology order, scan and report
Accession	The physician’s name taken from the “Referring Physician’s Name” DICOM field.
Institution Address*	The address of the institution where the study was created.
Institution•	The name of the image acquisition system.

* By default, these columns are not displayed in the Study List. For information on how to insert them, see “To insert hidden Study List columns” on page 40.

Chapter 7: Selecting Patient Studies *(continued)*

Searching the Study List

You can use the Search feature to locate studies in the data source if you know information about the patient (e.g., patient name, patient ID, accession number, or study date). To remove the Search criteria at any time, click **Clear**.



The Search feature clears the applied filter from the Study List.

To search the Study List

1. In the Search toolbar, type a value in any or all of the “Last Name, First Name”, “Patient ID”, or “Accession No” text fields.
 - You need to type only the first few characters in the “Last Name, First Name” or “Patient ID” field. The more information you type, the more refined the search.

2. If you want to search the Study List for studies created between a date range, select the following checkboxes:
 - “From” — Select this checkbox, then select the start date. The application searches the Study List for studies created on or after the specified date. Any studies created before the “From” date are considered to be prior studies.
 - “To” — Select this checkbox, then select the end date. The application searches the Study List for studies created before or on the specified date.
3. If you want to search the Study List for studies that match specific criteria, select the appropriate field (e.g., Study ID, Body Part, Physician) from the Select a Field dropdown list. In the text box below, type information specific to the selected item. For example, select Body Part and type “pelvis”. The application will search the Study List for pelvic studies.
4. Click **Go!** or press **ENTER**.
5. The application lists in the Study List the studies that match the search criteria you entered.

Chapter 7: Selecting Patient Studies *(continued)*

Filtering the Study List

You can filter the Study List to display only the studies that meet certain criteria.

You can filter the Study List using predefined filters or customized filters.

If, at any time, you cannot locate a particular study in the Study List, check the filter setting. You can click All to clear the filters and display all studies in the Study List.



By default, the application can initially retrieve a maximum of 500 studies. To increase or decrease this limit, please contact your System Administrator or Customer Service Specialist.

Filter Criteria

You can define and/or edit filters based on the criteria listed in Table 7.2 on page 25.

For each filter you define and/or edit, you can specify as many criteria as required. For example, you can define a filter that will display all CR patient studies acquired in the last five days. The filters you define are automatically saved with your user name.

Chapter 7: Selecting Patient Studies

Filtering the Study List (continued)

Table 7.2 – Filter Criteria

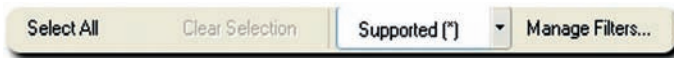
Criteria	Options	Application Displays
Modality	Any modality	Studies of any modality.
	Only the following modalities	Studies of the selected modality. You can select as many modalities as required
Study Date / Time	Any study date	Studies created on any date.
	Last x hour(s)	Studies created in the last x hours, where x is the number you specify.
	Last x day(s)	Studies created in the last x days, where x is the number you specify.
	From/To	Studies created between the From date and the To date that you specify. Any studies created before the From date and not currently displayed in the filter results are considered to be prior studies. The way your application displays the date is controlled by the operating system's Regional Settings. See "Date and Number Format" on page 3 for an explanation.
Procedure	Any procedure	Studies of any procedure.
	Only procedures containing the following text	Studies that have procedures containing the text you specify. By default, "femur", "pelvis", and "spine" are available. To add a procedure, click Add and type a name in the Add Procedure dialog box. Click Add, then click Close. The procedure type is added to the list.
Institution	Any institution	Studies created at any institution
	Only institutions containing the following text	Studies created at institutions containing the text you specify. To add an institution, click Add and type a name in the Add Institution dialog box. Click Add, then click Close. The institution is added to the list.
Physician	Any referring physician	Studies with any referring physician name.
	Only the following referring physicians	Studies that have referring physicians containing the text you specify. To add a physician, click Add and type a last name and/or first name in the Add Physician dialog box. Click Add, then click Close. The physician's name is added to the list.

Chapter 7: Selecting Patient Studies

Filtering the Study List (continued)

Specifying the Filter Buttons to be Displayed

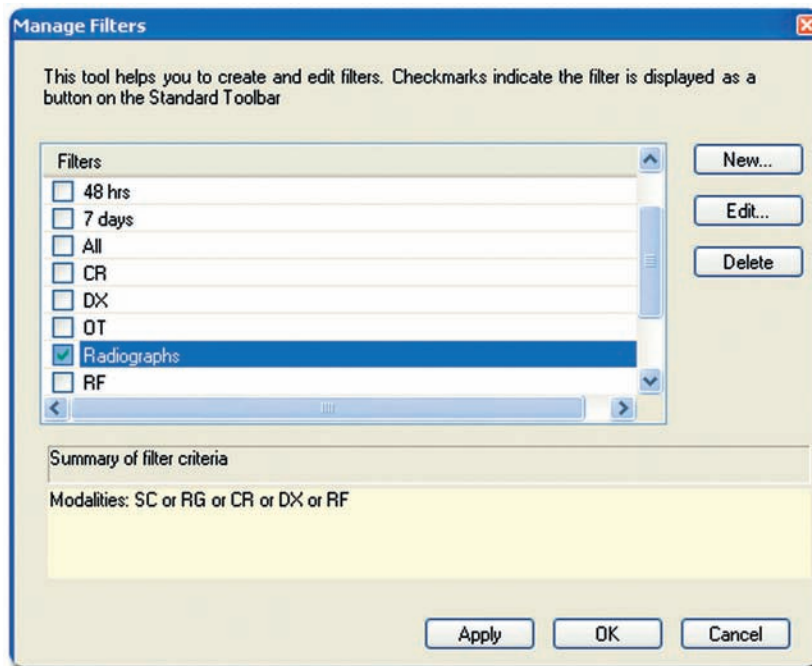
The application provides several predefined filters. For filters that you will be using often, you can specify filter buttons to be displayed on the Standard Toolbar or in the Select a Filter list. By default, the “Select All” filter button is displayed on the toolbar.



When the application first displays the Study Selection window for a data source, it applies the default filter, which is identified by an asterisk. For information on choosing which filter to use as the default, see “Specifying the Default Filter” on page 30.

To specify the filter buttons to be displayed on the Standard Toolbar

1. Click Manage Filters.



2. Select the checkbox next to each filter that you want to be displayed on the toolbar of the Study Selection window.
3. Click Apply.
4. Click OK to close the dialog box.
5. The selected filters appear as buttons on the toolbar of the Study Selection window.

Chapter 7: Selecting Patient Studies

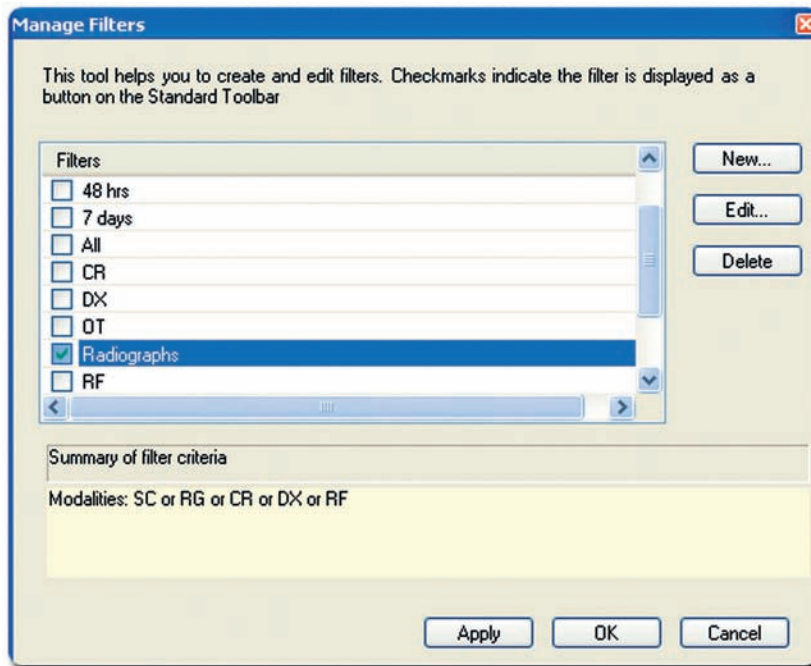
Filtering the Study List (continued)

Defining a New Filter

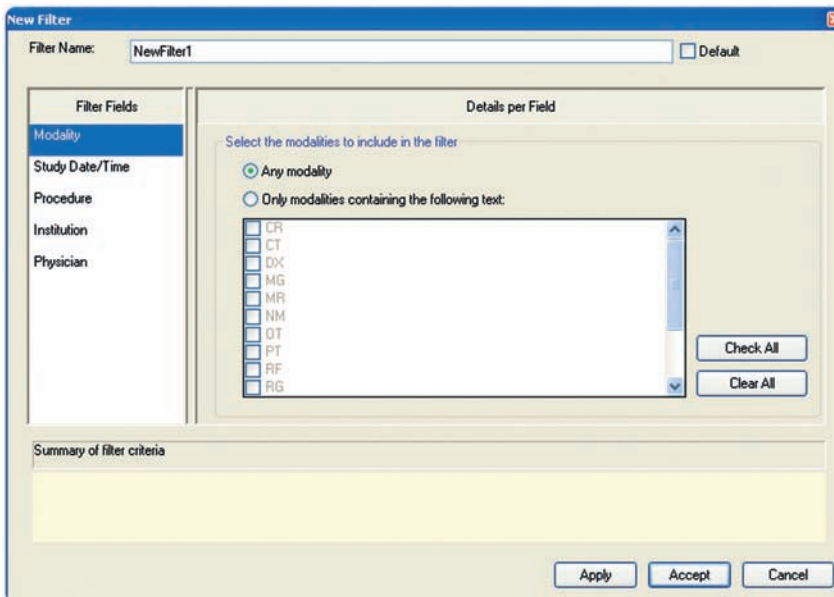
In addition to using predefined filters to filter the Study List, you can define new filters. These new filters are added to the filter list.

To define a new filter

1. Click Manage Filters.



2. Click New.



Chapter 7: Selecting Patient Studies

Filtering the Study List (continued)

3. In the Filter Name field, type a unique name for the filter.
4. In the Filter Fields list, click an item (e.g., Procedure) and specify the filter criteria in the Details Per Field window pane. See Table 7.2 on page 25 for details.
5. Repeat **Step 4** for each filter field that you want to define.
6. The application displays a summary of the specified filter criteria at the bottom of the dialog box.
7. When you are finished, do one of the following:
 - Click **Apply** to automatically apply the filter to the studies in the data source without saving the filter.
 - Click **Accept** to save the filter and automatically apply it to the studies in the data source.
8. Click **OK** to close the Manage Filters dialog box.

Editing a Filter

You can modify the criteria specified for a filter.

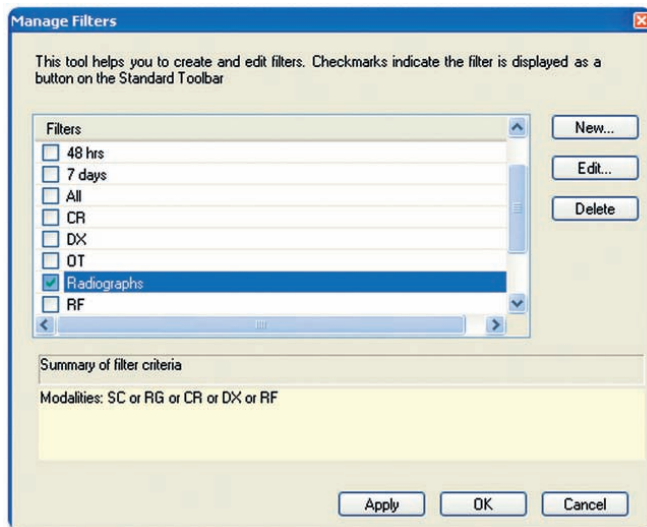


We recommend that you do not edit the predefined filters (e.g., “Radiographs”) because when you edit filters, you cannot revert back to the filter’s original settings.

To revert back to the criteria settings specified when the filter was last saved, click Reset in the Edit Filter dialog box. The filter does not revert back to its original settings.

To edit a filter

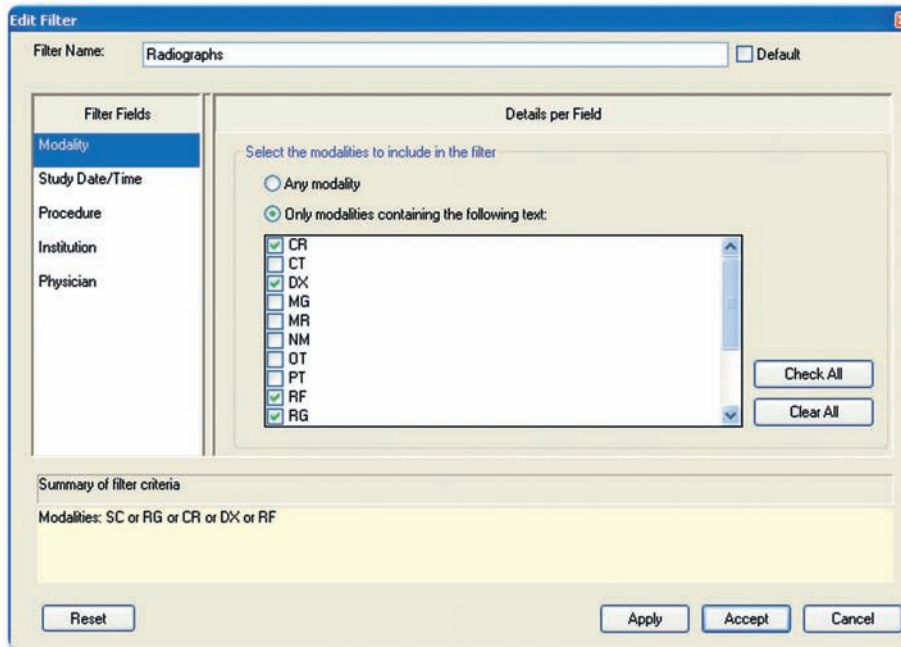
1. Click **Manage Filters**.



Chapter 7: Selecting Patient Studies

Filtering the Study List (continued)

2. Click the filter you want to edit.
3. Click **Edit**.



4. In the Filter Fields list, select the criteria you want to edit (e.g., Procedure).
5. Edit the filter criteria in the Details Per Field window pane. See Table 7.2 on page 25 for details.
6. Repeat **Steps 4 through 5** for each filter criteria you want to edit.
7. The application displays a summary of the specified filter criteria at the bottom of the dialog box.
8. When you are finished editing the filter, do one of the following:
 - Click **Apply** to automatically apply the filter to the studies in the data source without saving the filter changes.
 - Click **Accept** to save the filter changes and automatically apply the edited filter to the studies in the data source.
9. Click **OK** to close the Manage Filters dialog box.

Chapter 7: Selecting Patient Studies

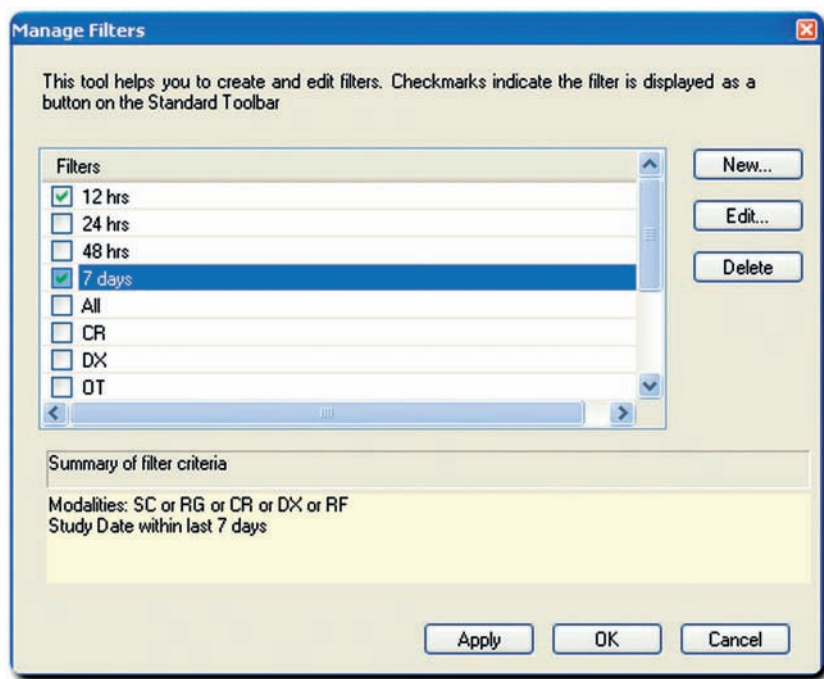
Filtering the Study List (continued)

Specifying the Default Filter

Use the following procedure to specify the default filter.

To specify the default filter

1. Click **Manage Filters**.
2. Click the filter you want to specify as the default. The current default filter is identified by (*), for example, **Radiographs (*)**.



3. Click **Edit**.

Chapter 7: Selecting Patient Studies

Filtering the Study List (continued)

4. Select the “Default” checkbox.

Select this checkbox

Filter Name: 7 days ☒ Default

Filter Fields

- Modality
- Study Date/Time
- Procedure
- Institution
- Physician

Details per Field

Select the modalities to include in the filter

☐ Any modality

☒ Only modalities containing the following text:

- ☒ CR
- ☐ CT
- ☒ DX
- ☐ MG
- ☐ MR
- ☐ NM
- ☐ OT
- ☐ PT
- ☒ RF
- ☒ RG

Check All

Clear All

Summary of filter criteria

Modalities: SC or RG or CR or DX or RF

Study Date within last 7 days

Reset Apply Accept Cancel

5. If necessary, edit the filter criteria for the filter that you are specifying as the default (see “Editing a Filter” on page 28).
6. Do one of the following:
 - Click **Apply** to automatically apply the default filter (overriding the default filter that was previously applied) to the studies in the data source without saving the filter as the default.
 - Click **Accept** to save the default filter without automatically applying it to the studies in the data source.
7. Click **OK** to close the Manage Filters dialog box.
8. The new default filter is indicated by the asterisk.

Select All Clear Selection 7 days (*) Manage Filters...

Default Filter

Chapter 7: Selecting Patient Studies

Filtering the Study List (continued)

Deleting a Filter

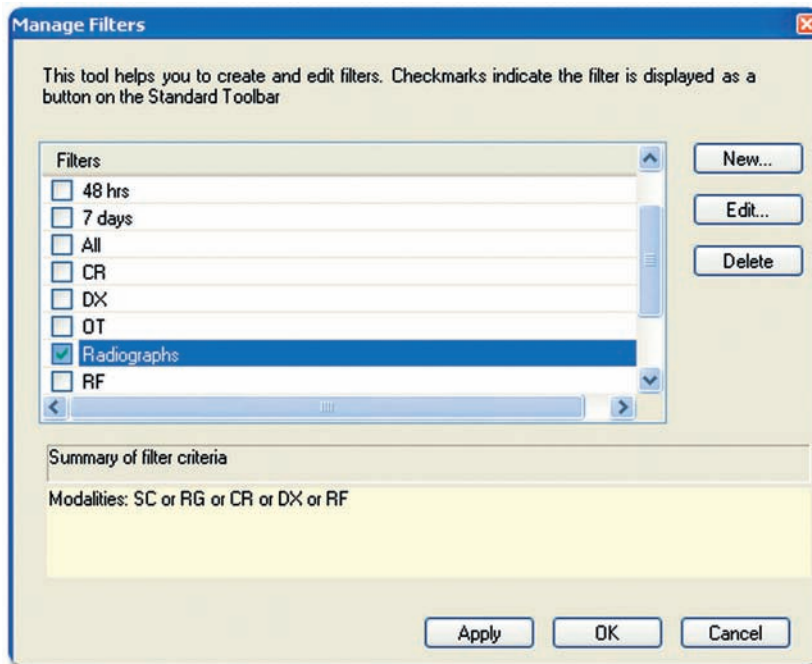
You can remove a filter that you no longer need.



You cannot delete the default filter. If you want to delete the default filter, you must specify another filter as the default first (see “Specifying the Default Filter” on page 30). In addition, you cannot delete the currently applied filter. If you want to delete the currently applied filter, you must apply another filter to the Study List first (see “Applying a Filter” on page 33).

To delete a filter

1. Click Manage Filters.



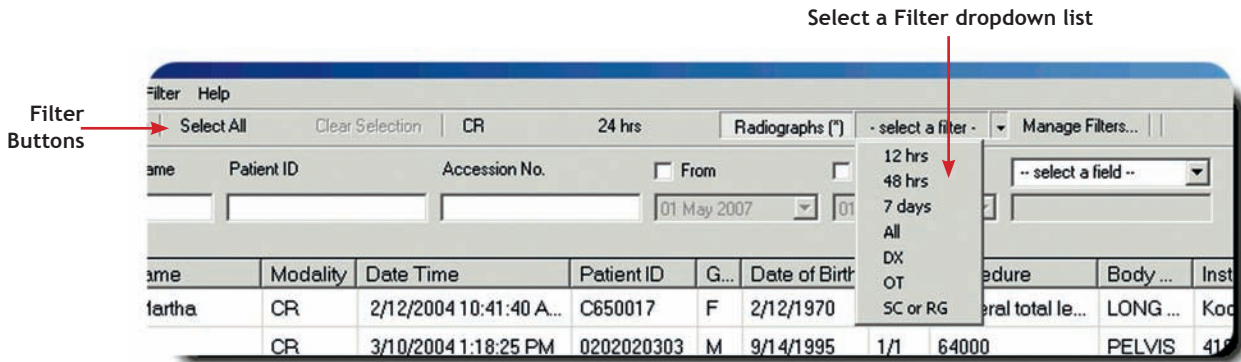
2. Click the filter you want to remove.
3. Click **Delete**.
4. When the application asks if you are sure you want to delete the selected filter, click **Yes**.
5. The application removes the specified filter.

Chapter 7: Selecting Patient Studies

Filtering the Study List (continued)

Applying a Filter

You can filter the Study List using the criteria specified in an existing filter.



To apply a filter

1. On the Standard Toolbar, do one of the following:
 - Click **Radiographs** to clear the filters and display all studies in the Study List.
 - Click the appropriate filter button (see “Specifying the Filter Buttons to be Displayed” on page 26) for the filter you want to apply.
 - Click the **Select a Filter** dropdown list and select the filter you want to apply from the list of available filters. You can filter your study list by modality (i.e., CR and DX), secondary captures (i.e., SC) or by studies acquired recently (e.g., the last 7 days, the last 48 hours and so on).
2. The application applies the filter to the Study List.
3. If the application reaches its initial maximum limit (the default is 500) for study retrieval, the application displays a message asking if you want to continue the query.
4. Click **Yes** to continue the query or click **No** to stop the query. Keep in mind that retrieving a large number of studies may slow down the performance of the application.

Chapter 7: Selecting Patient Studies *(continued)*

Using the Popup Menu to Access Study List Functions

As with most Windows applications, you can right-click the desktop to display a popup menu. While in the Study List, the popup menu provides access to some Study List functions.

To access these functions

1. In the Study List, right-click the study and select the appropriate function from the menu.
2. For detailed instructions on the function you choose, refer to the pages noted below:
 - Load (see “Selecting and Loading Studies for Review” on page 34)
 - Delete Studies (see “Deleting Patient Studies” on page 37)
 - Delete Series (see “Deleting Patient Studies” on page 37)

Selecting and Loading Studies for Review

When you load one or multiple studies, the Main Review window displays the image in 1x1 layout by default, and automatically optimizes the window width/level. If the study has saved image parameter settings, the Main Review window displays images using the last saved settings (see “Saving, Loading and Resetting Image Display Parameters” on page 105).

You can select and load studies for review in several ways. If you select and load studies from more than one patient, the application places the studies in a Work List (see “Selecting Other Studies from the Work List” on page 55).



You can simply double-click a study to select and load it for review.

Click Clear Selection on the Standard Toolbar to deselect the highlighted studies in the Study List.

Selecting and Loading a Study

Use the following procedure to select and load a study.

To select and load a study

1. In the Study List, click the desired study.
2. Click **Load** on the Standard Toolbar.
3. The application displays the selected study in the Main Review window.

Chapter 7: Selecting Patient Studies

Selecting and Loading Studies for Review (*continued*)

Selecting and Loading Specific Studies or All Studies

Use the following procedures to select and load specific studies or all studies for review.

To select and load specific studies

1. In the Study List, select the required study. To select multiple studies in the list, hold down the CTRL key or SHIFT key while selecting the studies.
2. The application highlights the selected studies.
3. Click **Load** on the Standard Toolbar.
4. The application displays the selected studies in the Main Review window.

To select and load all studies

1. If desired, filter the Study List to display only certain types of studies (see “Filtering the Study List” on page 24). For example, if you want to load all unread studies, filter the list to display only the studies that have not been read.
2. From the **Edit** menu, click **Select All**.
3. The application highlights all the studies in the Study List.
4. Click **Load** on the Standard Toolbar.
5. The application displays the selected studies in the Main Review window.

To select and load studies for the same patient

1. In the Study List, click the desired study.
2. Do one of the following:
 - From the Edit menu, click **Select Same Patient** to select all studies for the same patient.
 - Hold down the CTRL key while selecting the desired studies for the same patient.
3. Click **Load** on the Standard Toolbar.
4. The application displays the thumbnails for all the selected studies in the Main Review window.

Chapter 7: Selecting Patient Studies

Selecting and Loading Studies for Review (*continued*)

Selecting and Loading Series within a Study

Use the following procedure to select and load specific series with a study for review.

To select and load specific series within a study

1. In the Study List, click the study that contains the specific series that you want to load.
2. The bottom of the Study Selection window displays a list of all the series in the study, with all the series in the list highlighted.



3. Clear the checkmark for the series that you do not want to load. Only the selected series will be loaded.
4. Click **Load** on the Standard Toolbar.
5. The application displays only the selected series in the Main Review window.

Editing Patient Studies

You can edit studies as described in this section. If you want to edit a patient study to match a study already in the data source, you must use the Merge Patients function rather than the Edit function (see “Merging Patient Studies” on page 38).



When you edit patient studies, the application does not mark the studies as changed; therefore, use caution when editing patient studies. Always check your changes before saving them and keep records of the changes you make.

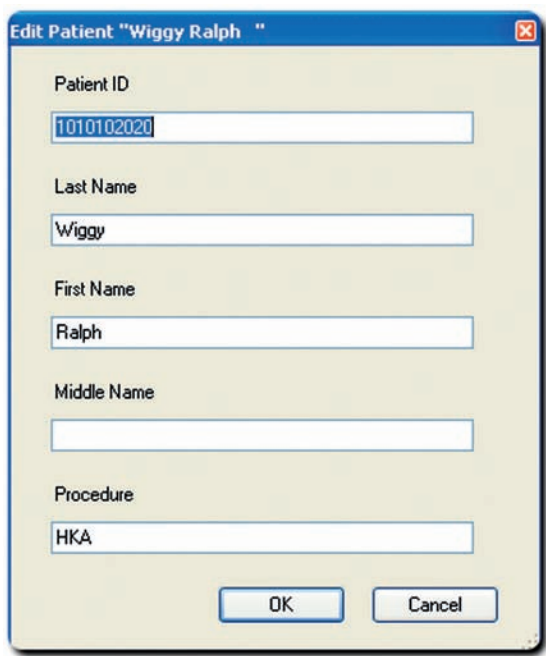
Do not attempt to edit a patient study until the entire study has been transferred to the data source.

Chapter 7: Selecting Patient Studies

Editing Patient Studies *(continued)*

To edit studies

1. From the Edit menu, click **Edit Patient**.



The screenshot shows a dialog box titled "Edit Patient 'Wiggy Ralph'". It contains several text input fields: "Patient ID" with the value "1010102020", "Last Name" with "Wiggy", "First Name" with "Ralph", "Middle Name" (empty), and "Procedure" with "HKA". At the bottom are "OK" and "Cancel" buttons.

2. Edit the fields appropriately.
3. Check your changes to ensure that they are correct.
4. Click **OK**.

Deleting Patient Studies

You can delete patient studies or series within the studies when you no longer need them in your local database. You should delete studies or series when your local database is full. The Study Selection window displays the amount of space available in your local database in the status bar.



To delete patient studies

1. In the Study List, select the studies that you want to delete.
2. Do one of the following:
 - From the Edit menu, click **Delete Studies**.
 - Right-click one of the selected studies and click **Delete Studies** from the popup menu.
3. When the application asks if you are sure you want to delete the studies, click **Yes**.

Chapter 7: Selecting Patient Studies

Merging Patient Studies (*continued*)

To merge patient studies with another patient



The Merge Patients feature merges all the studies of the selected patient(s) with another patient; it does not merge specific studies of the selected patient(s).

1. In the Study List, select one or more patients that you want to merge with another patient. You can select as many patients as required.
2. Right-click one of the selected patients and select **Merge Patients** from the popup menu.
3. Click the destination patient into which all of the studies for the selected patients will be merged.
4. Click **OK**.
5. When the application asks if you are sure you want to merge the studies, click **Yes**.

Customizing the Study Selection Window

You can customize the Study Selection window by resizing or rearranging the columns.

Sorting the Study List

You can sort the Study List in ascending or descending order using the column headings in the typical Windows manner. This is known as “primary sorting”. By default, studies are sorted in ascending order for primary sorting.



When you start the application for the first time, the Patient Name column is primary sorted (in ascending order) and the Date & Time column is secondary sorted (in descending order).

To apply primary sorting to the Study List

1. Click the appropriate column heading in the list (e.g., **Patient Name**).
2. The application sorts the patients in ascending or descending order according to the information in the column (either alphabetically or numerically, depending on the type of information).
3. Click the column heading again to reverse the order (i.e., Z to A).

Chapter 7: Selecting Patient Studies

Customizing the Study Selection Window *(continued)*

Configuring Study List Columns

You can hide columns in the Study List that you do not want to view. This can make room for other columns in the Study List that cannot fit on the screen.

To Hide Study List Columns

1. Right-click the column heading for the Study List column that you want to hide and click **Remove Column** from the popup menu.
2. The application removes the column from the Study List. To insert hidden Study List columns



By default, the Institution Address and Station are hidden. For descriptions of these columns, see “Study List Columns” on page 22.

1. Right-click any column heading in the Study List, select **Insert Column** and select the column that you want to insert from the popup menu.
2. The application inserts the column in the Study List.

Resizing Study List Columns

You can manually resize columns in the Study List by widening or shortening the Study List columns. In addition, the application can automatically resize a column so that the longest entry in the column can fit.

To manually resize a Study List column

1. Hover over the right edge of the Study List column that you want to resize.
2. The mouse pointer appears as shown here. 
3. Click and drag the mouse pointer to the left or right until the column is resized.

To automatically resize a Study List column heading

1. Right-click the column heading for the Study list column that you want to automatically resize and click **Best Fit** from the popup menu.
2. The application either widens or shortens the Study List column so that it fits the longest entry in the column.

Rearranging Study Columns

You can rearrange the order of the Study Columns in the Study List.

To rearrange the columns in the Study List

1. Click the **Study List Column** you want to move.
2. Drag the column to the appropriate position in the Study List.

Chapter 7: Selecting Patient Studies

Customizing the Study Selection Window (*continued*)

Hiding Elements in the Study Selection Window

To make more room on the Study Selection window for the Study List, you can choose to hide elements in the window (i.e., Standard Toolbar, Search Toolbar, status bar, and Series List).

To hide elements in the Study Selection window

1. From the **View** menu, select one of the following elements:
 - **Standard Toolbar** — Removes the Standard Toolbar which contains buttons for tasks such as loading studies, filtering the Study List, and retrieving priors.
 - **Search Toolbar** — Removes the Search Toolbar which lets you enter search criteria that the application uses to search for studies in the data source (see “Searching the Study List” on page 23).
 - **Status Bar** — Removes the status bar at the bottom of the Study Selection window. The status bar contains information on the data source name and usage, the number of studies displayed in the Study List, and the number of studies selected in the Study List.
 - **List Series** — Removes the Series List area at the bottom of the Study Selection window. The Series List area displays information about the series contained in the 35 Chapter 3 study selected in the Study List (see “Selecting and Loading Studies for Review” on page 34).
2. Select the hidden item from the View menu again to show the element in the Study Selection window.

Chapter 8:

Archiving and Transferring Patient Studies

This chapter describes how to:

- configure DICOM nodes (see “Configuring DICOM Nodes” on page 42);
- transferring patient studies to a DICOM archive (see “Transferring Patient Studies to a DICOM Archive” on page 47);
- export patient studies to a CD or workstation’s hard drive (see “Exporting Patient Studies” on page 48);
- import patient studies to your local database (see “Importing Patient Studies” on page 51); and
- filter the list of studies to import (see “Filtering the List of Studies” on page 52).

Configuring DICOM Nodes

The DICOM server allows the application to communicate with other DICOM devices.



You must use only DICOM 3.0 devices with the Sound-Eklin® Orthoplan Elite® application.



You must be logged on as Administrator to be able to configure the DICOM nodes.

Ensure that the System Administrator also adds the information of the workstation (i.e., AE title, port number, and host name or IP address), on which the Sound-Eklin® Orthoplan Elite® application is installed, to the destination workstation and servers.

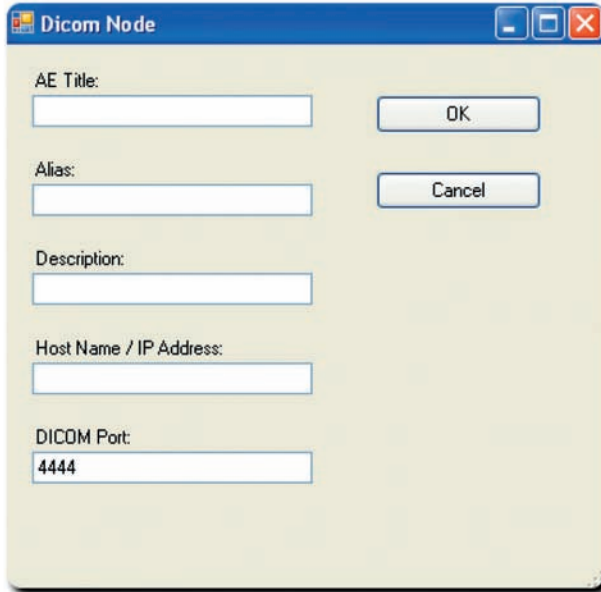
To configure DICOM nodes

1. Access the Study Selection window (see “Accessing the Study Selection Window” on page 21).
2. From the Tools menu, click **Dicom Nodes**.

Chapter 8: Archiving and Transferring Patient Studies *(continued)*

To add a DICOM device

1. In the DICOM Nodes dialog box, click **Add**.



2. Type the appropriate information in the following text fields:
 - AE Title – SCU/SCP application entity title. If the node that you are adding is another Sound-Eklin® Orthoplan Elite® workstation, then by default the AE Title is the host name of the computer. This field is mandatory.
 - Alias – AE Title alias. This field is optional.
 - Description – DICOM device description (e.g., MRI_UNIT, Archive). This field is optional.
 - Host Name / IP Address – Name or IP address of the host where the DICOM device resides. This field is mandatory.
 - DICOM Port – SCU/SCP socket port number. This field is mandatory.
3. Click **OK**.

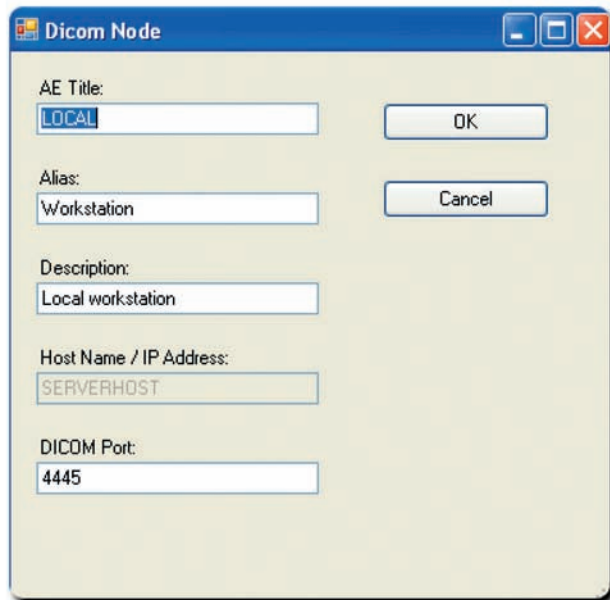
To modify a DICOM device



Please contact your System Administrator prior to modifying the LOCAL device. This DICOM device pertains to your Sound-Eklin® Orthoplan Elite® workstation.

Chapter 8: Archiving and Transferring Patient Studies *(continued)*

1. In the DICOM Node dialog box, select the device that you want to modify (e.g., TEST_WORKSTATION), then click **Modify**.

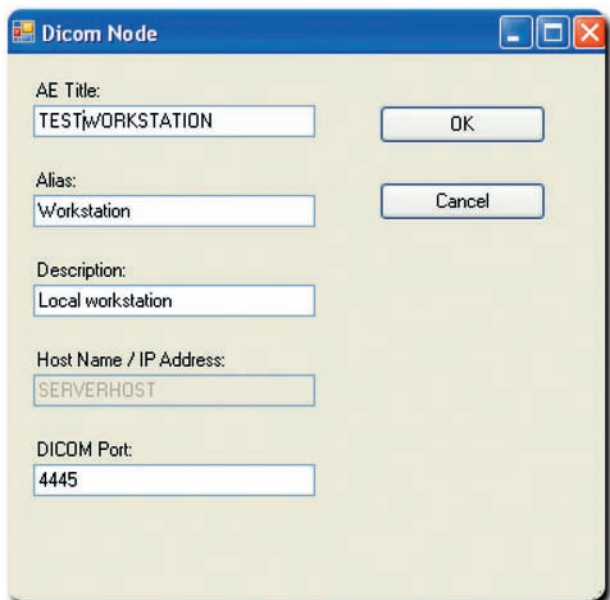


The screenshot shows the 'Dicom Node' dialog box with the following fields and values:

- AE Title: LOCAL
- Alias: Workstation
- Description: Local workstation
- Host Name / IP Address: SERVERHOST
- DICOM Port: 4445

The 'OK' button is highlighted.

2. Modify the contents of the text fields as required.



The screenshot shows the 'Dicom Node' dialog box with the following fields and values:

- AE Title: TESTWORKSTATION
- Alias: Workstation
- Description: Local workstation
- Host Name / IP Address: SERVERHOST
- DICOM Port: 4445

The 'OK' button is highlighted.

3. Click **OK**.

Chapter 8: Archiving and Transferring Patient Studies *(continued)*

To delete a DICOM device



Do not delete the LOCAL device. This DICOM device refers to your Merge OrthoCase workstation.

1. In the DICOM Node dialog box, select the device that you want to delete (e.g., LOCAL), then click **Remove**.

2. The application removes the selected device.

Chapter 8: Archiving and Transferring Patient Studies

Transferring Patient Studies to a DICOM Archive (*continued*)

4. From the Archive dropdown list, select the desired destination archive. If the desired archive is not available from the list, add it (see “To add a DICOM device” on page 44) then select it from the Archive dropdown list.
5. Click **OK**.
6. When you return to the Study Selection window, the Standard Toolbar displays the Archive button.

To archive a study or a series

1. In the Study List, select a patient study to archive.
2. The Series List (at the bottom of the Study Selection window) displays a list of all the series in the study.
3. To archive all series within a study, select the checkbox for each series; otherwise, clear the checkbox for the series you do not want to archive.
4. Click the **Archive button**.
5. The Series List marks the Archive column with “Yes” to indicate which series have been archived.

Series List						
	Description	M.	Series Number	# Images	Date Time	View Position
☒		CR	1	1	143400	
☒		CR	2	1	143400	
☐		CR	3	1	143400	
☐		CR	4	1	143700	
☐		CR	5	1	143800	
☐		CR	6	1	143800	
						Archived
						Yes
						Yes

6. To archive multiple studies, select the studies using the **CTRL key** and click the **Archive button**.
7. To specify which series to archive within multiple studies, repeat Steps 1 through 3, then select the studies using the **CTRL key** and click the **Archive button**.

Exporting Patient Studies

You can select patient studies for export to a CD, workstation's hard drive or DICOM node. During the export, the application creates a DICOM directory on the destination.

The studies are created in DICOM part-10 format, therefore, a DICOM image viewer is required to view the images.



When using a CD as storage media, you must follow the CD manufacturer's instructions regarding handling and storage of the CD. Data may be lost or corrupted if the CD is mishandled or improperly stored.

Chapter 8: Archiving and Transferring Patient Studies

Exporting Patient Studies (*continued*)

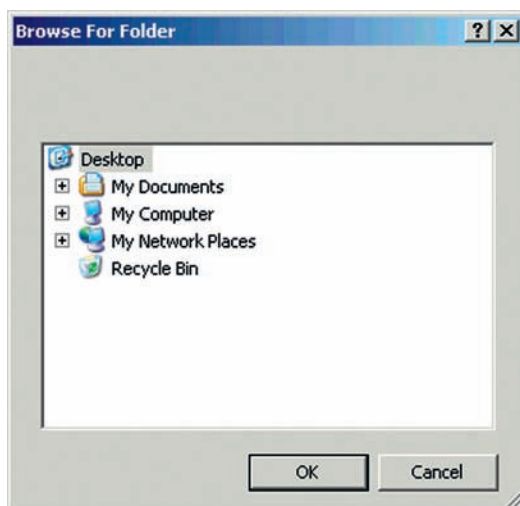


When exporting studies to a CD, the media must be blank. To export patient studies

1. From the File menu, select DICOM Media and click Export Studies.
2. From the Destination dropdown list, do one of the following:
 - If you are exporting to a CD or hard drive, select Browse local.
 - If you are exporting to a DICOM device, select the name of the DICOM node.

The screenshot shows the 'DICOM Media: Import Studies' dialog box. It features a 'Source' dropdown menu at the top. Below it are input fields for 'Last Name', 'First Name', 'Patient ID', 'Study ID', 'Modality', and 'Accession No.'. There are also date pickers for 'From' and 'To' dates, both set to '2011-04-07'. Buttons for 'Import', 'Stop Import', 'Query', 'Clear', and 'Stop Query' are present. A large table with columns 'Patient Name', 'Patient ID', 'Modality', 'Study Date', 'Study Time', 'Study ID', 'Accession Num...', 'Total Items', and 'No. Imported' occupies the middle section. Below the table is a 'Series List' section with a scrollable area. The status bar at the bottom indicates 'Ready'.

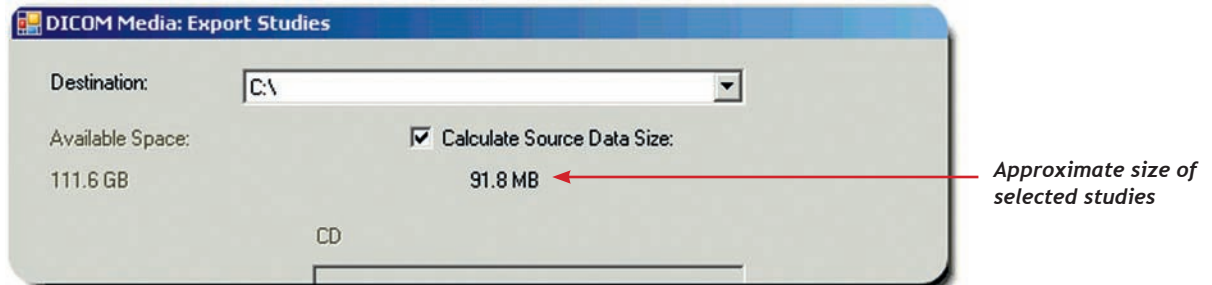
3. If you selected Browse local... in Step 2, browse to the destination (i.e., CD or hard drive) for the transferred studies, and click OK.



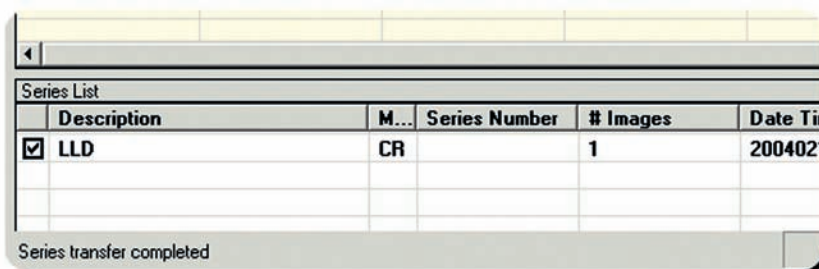
Chapter 8: Archiving and Transferring Patient Studies

Exporting Patient Studies *(continued)*

4. If you selected a hard drive as the destination, the Available Space field specifies the amount of space (in GB) available on the hard drive. There may be a slight delay in displaying the available disk space. If you select a CD as the destination, the Available Space field is greyed out.
5. To ensure that the destination has the capacity to receive the selected studies, select the “Calculate Source Data Size” checkbox to see the approximate size of the selected studies.



- If you select a CD as the destination, in the CD Label field, type a label for the CD. Do not enter a label if your application has been configured to use Microsoft Windows XP native CD-recording software or Golden Hawk Technology’s CDRWIN 3.9H software based on Windows ASPI driver versions previous to 4.7.1.
6. If required, filter the list of studies so you can easily locate the specific studies you want to export (see “Searching the Study List” on page 23).
 7. Click the studies you want to export. To select multiple studies, hold down the **CTRL** key or the **SHIFT** key while selecting the studies.
 8. Click **Export**.
 9. The application transfers the studies to the selected location. At any time, you can click Stop to terminate the transfer. If exporting studies from a CD, do not remove the media until the transfer operation is complete.
 10. The application displays the progress of the transfer in the status bar at the bottom of the dialog box.



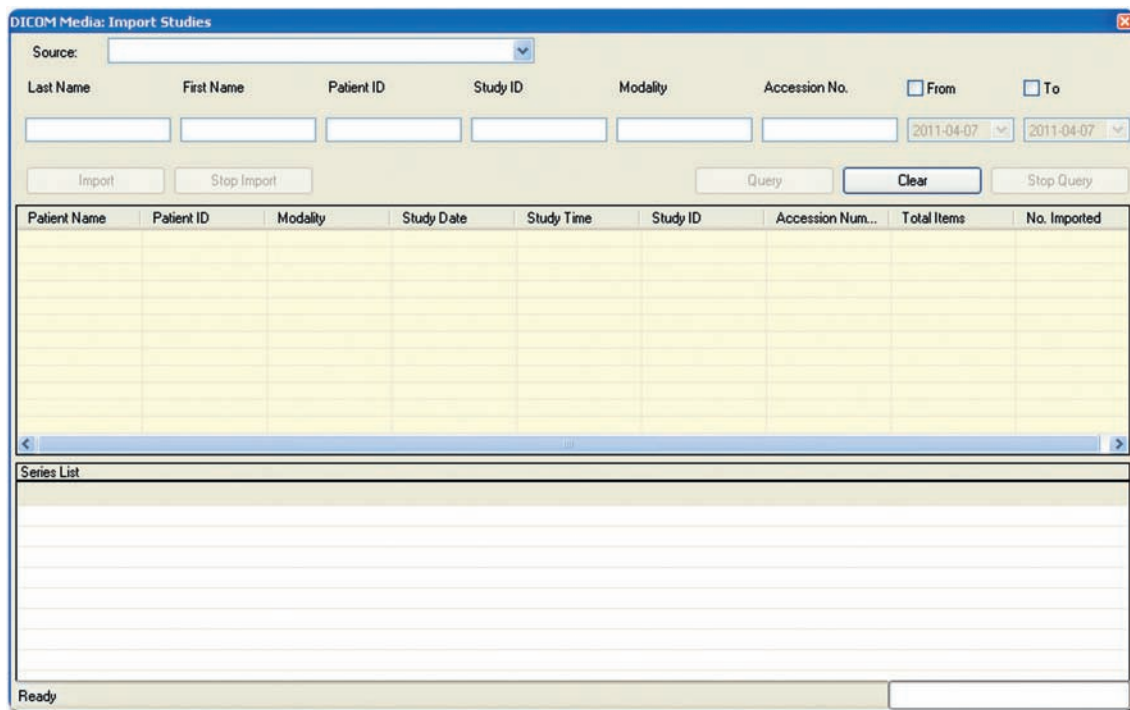
Chapter 8: Archiving and Transferring Patient Studies *(continued)*

Importing Patient Studies

You can transfer studies from a CD, workstation's hard drive or a DICOM device to your local database.

To import patient studies

1. From the File menu, select DICOM Media and click **Import Studies**.
2. From the Source dropdown list, do one of the following:
 - If you are importing from a CD or hard drive, select **Browse local**.
 - If you are importing from a DICOM device, select the name of the DICOM node.



The 'DICOM Media: Import Studies' dialog box is shown. It features a 'Source' dropdown menu at the top. Below it are input fields for 'Last Name', 'First Name', 'Patient ID', 'Study ID', 'Modality', and 'Accession No.'. There are also date pickers for 'From' and 'To' dates, both set to '2011-04-07'. Buttons for 'Import', 'Stop Import', 'Query', 'Clear', and 'Stop Query' are present. A table with columns: Patient Name, Patient ID, Modality, Study Date, Study Time, Study ID, Accession Num..., Total Items, and No. Imported is displayed. Below the table is a 'Series List' section. The status bar at the bottom indicates 'Ready'.

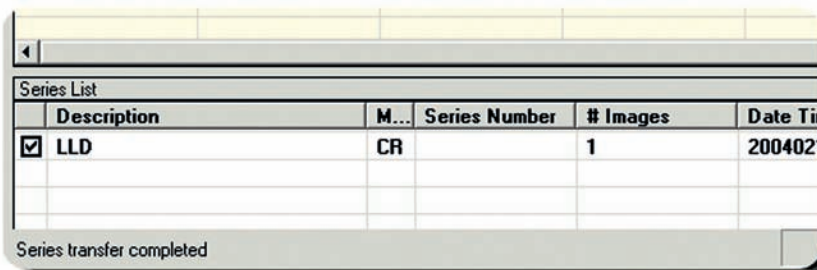
3. If you selected Browse local in Step 2, browse to the source (i.e., CD or hard drive) that contains the studies you want to import, and click **OK**.



Chapter 8: Archiving and Transferring Patient Studies

Importing Patient Studies (*continued*)

- The source (or folder) must also contain the DICOM directory.
 - If the DICOM directory is missing, the application generates a list of the studies in the source location. It may take a while depending on the number of studies in the source location.
4. The application lists all the studies that are located on the selected data source.
 5. If required, filter the list of studies so you can easily locate the specific studies you want to import (see “Filtering the List of Studies” on page 52).
 6. Select the studies that you want to import. To select multiple studies, hold down the **CTRL** key or the **SHIFT** key while selecting the studies.
 7. Click Import.
 8. The application transfers the selected studies to your local database. At any time, you can click Stop Import to terminate the transfer. If importing studies from a CD, do not remove the media until the transfer operation is complete. 49 Chapter 4
 9. The application displays the progress of the transfer for each study in the “No. Imported” column. The application also displays the status of the transfer in the status bar at the bottom of the dialog box.



Filtering the List of Studies

If required, filter the list of studies so that it is easier to locate the studies you want to import.



You can click Clear at any time to revert back to the original list of studies.

Last Name	First Name	Patient ID	Study ID	Modality	Accession No.	From	To
						20060907	20060907

To filter the list of studies

1. In the filter toolbar, type a value in any or all of the “Last Name”, “First Name”, “Patient ID”, “Study ID”, and “Accession No” text boxes. You need to type the entire name, ID or number in the text box you are using to filter the Study List.

Chapter 8: Archiving and Transferring Patient Studies

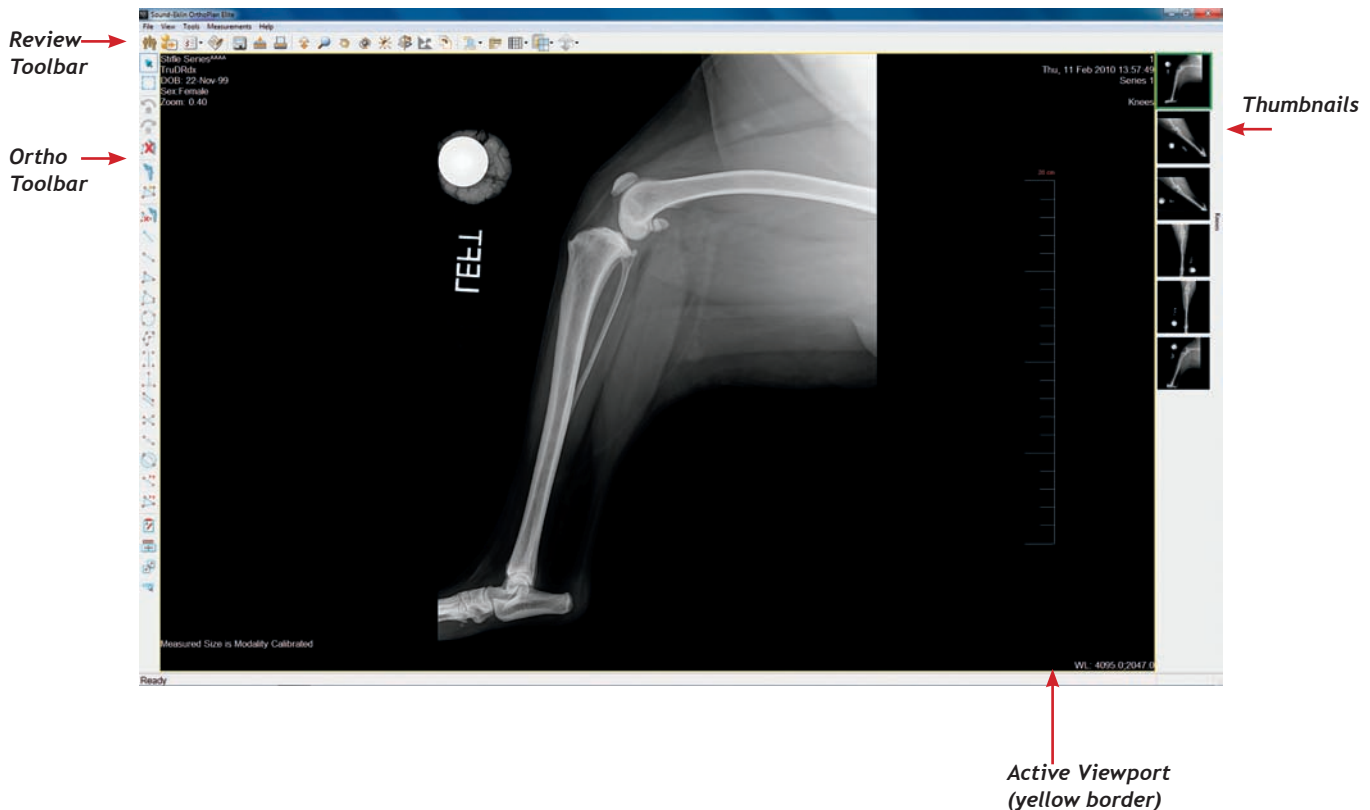
Filtering the List of Studies (*continued*)

2. If you want to filter the list for studies created between a date range, select the following checkboxes:
 - “From” — Select this checkbox, then select the start date. The application filters the list for studies created on or after the specified date.
 - “To” — Select this checkbox, then select the end date. The application searches the list for studies created before or on the specified date.
3. Press **ENTER** or click **Query**.
4. The application lists the studies that match the filter criteria you entered.

Chapter 9:

Using the Main Review Window

Loaded images are displayed in the Main Review window. This chapter describes the features of the Main Review window which consists of the Review toolbar, the Ortho toolbar, and thumbnails.



Selecting Other Studies from the Study List

When you finish reviewing the current study, you can access the Study List to select other studies for review.



If you originally loaded more than one patient's studies for review, refer to "Selecting Other Studies from the Work List", below.

To access the Study List

1. In the Review toolbar, click the **Open Study** button.
2. The application displays the Study Selection window, which contains the Study List. For information on how to use the Study List, see Chapter 3.

Chapter 9: Using the Main Review Window

Selecting Other Studies from the Study List *(continued)*



If you have unsaved changes in the Main Review window, the application asks if you wish to save your changes. To save your changes, type a description for the changes and click OK. The application saves your changes as an entry in the Plan History dialog box (see “Saving, Loading and Resetting Image Display Parameters” on page 105).

Returning to the Main Review Window

You can move between the Study Selection window and the Main Review window without losing the changes made to the image. However, if you load a new study, any unsaved changes to the image are lost.



Ensure you save your changes before exiting the current patient study and loading a new patient study (see “Saving, Loading and Resetting Image Display Parameters” on page 105).

To return to the Main Review window

1. Do one of the following from the Study Selection window:
 - From the File menu, click Return to Review Page.
 - Press CTRL+L.

Selecting Other Studies from the Work List

For safety reasons, you can only review studies for one patient at a time. When you select and load studies from more than one patient (see “Selecting and Loading Studies for Review” on page 26), the application displays the first patient’s studies in the Main Review window, and places the other patients in the Work List so that you can quickly select them for review without having to return to the Study List.

To select another study for display

1. In the Review Toolbar, click the Work List button and select one of the other patients from the menu. The currently displayed patient is marked with a checkmark (e.g., Stevie Balco.).



2. The application displays the selected patient. To select the next patient in the Worklist

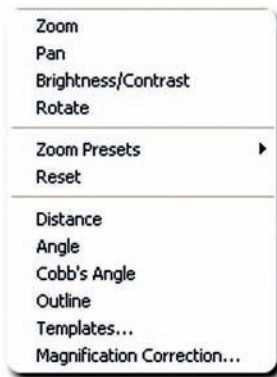
Chapter 9: Using the Main Review Window *(continued)*

Using the Popup Menu to Access Common Functions

As with most Windows applications, you can right-click a window to access a popup menu. While in the Main Review window, the popup menu provides access to certain viewing functions, common review tools, common orthopaedic measurement tools and orthopaedic templates.

To use the popup menu

1. Right-click any viewport and select the appropriate option from the popup menu.



2. The application dismisses the menu and performs the operation. If you select one of the review tools (e.g., Window level), the application changes the function of the left mouse button to the selected tool and remains set to that function until you select a different tool. The function of the left mouse button is indicated by the pointer. For example, if the left mouse button is set to Pan, the mouse pointer appears as shown here.



Customizing the Popup Menu

You can customize the options available in the popup menu. The popup menu customizations you specify are saved according to your user name.

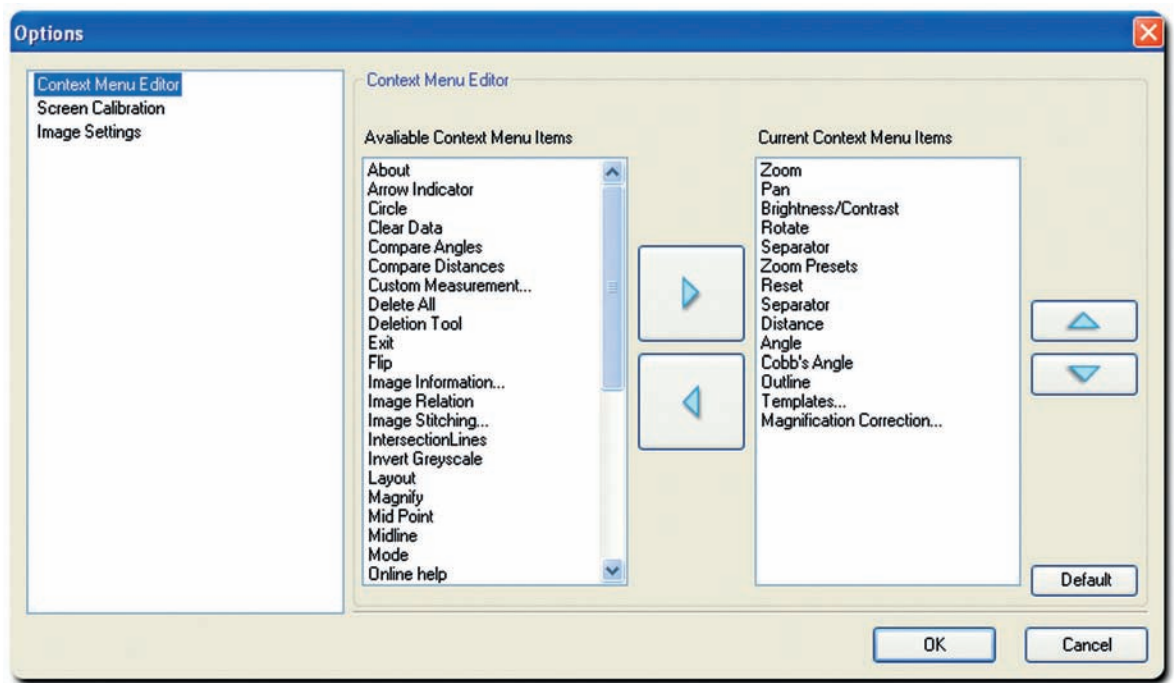
To customize the popup menu

1. From the Tools menu of the Main Review window, click **Options**.

Chapter 9: Using the Main Review Window

Customizing the Popup Menu (*continued*)

2. By default, the Options dialog box selects Context Menu Editor.



3. The tools that currently appear in the menu are listed in the Current Menu Items column on the right side of the dialog box.
4. Add, remove, or rearrange the items, as described below.
5. When you finish, click **OK**.

To add a tool to the popup menu

1. In the Available Context Menu Items list on the left side of the dialog box, click the item you want to add.
2. Click the **Add** button.



3. Add a Separator, if required. Adding a Separator places a space between the buttons in the menu so you can group the items in a way that is meaningful to you.

Chapter 9: Using the Main Review Window

Customizing the Popup Menu (*continued*)

To remove a tool from the popup menu

1. In the Current Menu Items list on the right side of the dialog box, click the item you want to remove.
2. Click the **Remove** button.



To rearrange the tools in the popup menu

1. In the Current Menu Items list on the right side of the dialog box, click the item you want to move.
2. Click the **Move Up** or **Move Down** button (as appropriate) to change the position of the item in the list.



Chapter 9: Using the Main Review Window *(continued)*

Using the Thumbnails

Thumbnails represent the loaded series. They allow you to see all the images available in one or many loaded studies for the same patient including any stitched images.

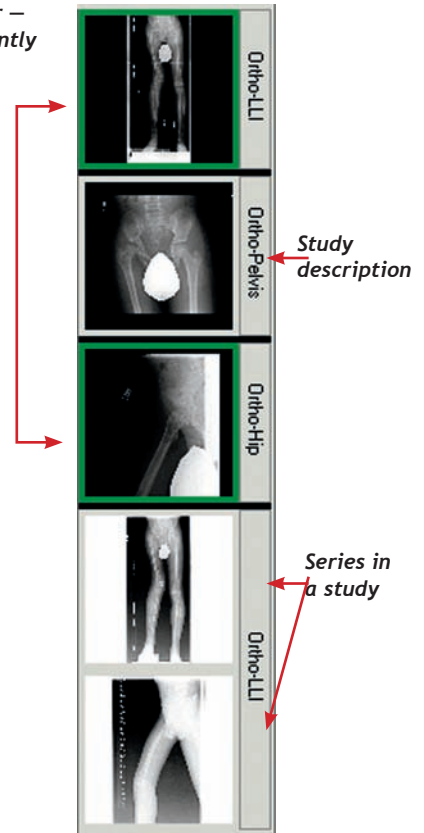
To help with navigation, the application uses visual cues on the thumbnails, for example, a green border indicates which image is currently being displayed in the Main Review window.

The example below shows how the thumbnails represent four studies that were loaded for a single patient.

To use the thumbnails

1. Load patient studies for review (see “Selecting and Loading Studies for Review” on page 34).
2. The application displays the thumbnails for the loaded patient. The application highlights (with a green border) the thumbnail that corresponds to the image currently displayed in the viewport. By default, the Main Review window displays the first image in the study in a 1x1 layout.
3. To change the image in the viewport in 1x1 layout, click a thumbnail.
4. To change the image in a viewport using a multiple viewport layout (e.g., 2x3 layout), do one of the following:
 - Click the desired viewport, then click the desired thumbnail.
 - Click and drag the desired thumbnail to a viewport.
5. To rearrange the images in a multiple viewport layout (e.g., 2x3 layout), click and drag the image from one viewport to another.

*Green border –
Images currently
displayed*



Chapter 10: Selecting the Viewing Mode

You can view images in different ways depending on the type of study that is loaded. The following view modes are available:

- Tile mode — Tile mode can be used for any type of study.
- Stack mode — Stack mode is used for viewing cross-sectional studies. When Stack mode is available, you can switch between Tile mode and Stack mode.

Viewing in Tile Mode

Tile mode provides a conventional approach to viewing. The images are viewed on the screen similarly to the way film is viewed on a light box. This provides an overview of the entire study and allows you to look at the pathology on either side of the anatomy of interest. An example of a screen layout in Tile mode is shown below.

Series 1 Image 1	Series 1 Image 2	Series 1 Image 3	Series 2 Image 1	Series 2 Image 2	Series 2 Image 3
Series 1 Image 4	Series 1 Image 5	Series 1 Image 6	Series 2 Image 4	Series 2 Image 5	Series 2 Image 6
Series 1 Image 7	Series 1 Image 8	Series 1 Image 9	Series 2 Image 7	Series 2 Image 8	Series 2 Image 9

To switch between Tile and Stack viewing

1. Do one of the following:
 - From the View menu, select **Mode** and click **Tile** or **Stack**.
 - In the Review Toolbar, click the **Viewing Mode** button and click **Tile** or **Stack**.



2. The application switches to the other viewing mode and displays the images appropriately.

To scroll in tile mode

- Click and drag the scrollbar.
- Rotate the wheel button on the mouse:
 - away from you to scroll backward through the images; or
 - toward you to scroll forward through the images.

Chapter 10: Selecting the Viewing Mode *(continued)*

Viewing in Stack Mode

Stack mode provides a benefit that is unique to digital workstations. Images in the series are stacked on top of each other and only one image is visible at a time. As you scroll through the images in the series, you get a sense of the spatial relationship between the images allowing you to see more subtle differences in the pathology. Stack mode is applicable mainly to CT, MR images or where studies contain multiple stacked images in a series. An example of how you might set up the screen in Stack mode is shown below.



When Stack mode is available, you can easily and quickly toggle between Stack and Tile viewing.

To switch between Tile and Stack viewing

1. Do one of the following:
 - From the View menu, select **Mode** and click **Tile** or **Stack**.
 - In the Review Toolbar, click the Viewing Mode button and click **Tile** or **Stack**.



2. The application switches to the other viewing mode and displays the images appropriately.

To scroll in stack mode

- Click and drag the scrollbar.
- Rotate the wheel on the mouse:
 - away from you to scroll backward through the slice stack; or
 - toward you to scroll forward through the slice stack.

Chapter 11:

Using the Review and Ortho Tools

This chapter describes how to use the tools provided for standard image review in the Main Review window. You can access all tools from the Review and Ortho toolbars, as well as the Measurement menus.



To ensure accurate results, we strongly recommend you correct the magnification of an image before you begin.

Correcting Image Magnification

Use the Correct Magnification tool to calibrate the caliper in an image. You can calibrate an image using five distinct methods. The method you choose depends on whether a calibration sphere was used during acquisition.

If a calibration sphere of a known diameter (i.e., 1 inch or 25 mm) exists on the image and the image has a pixel spacing value in its DICOM header (i.e., application displays a caliper in the image viewport), you can use the following calibration methods:

- Fully-automatic calibration sphere detection – The application first attempts to automatically detect and outline the calibration sphere. If correctly detected, you can specify its diameter and calibrate the image (see “Calibrating Images Using a Calibration Sphere” on page 69).
- Click on a point on the sphere – Click a point on the calibration sphere to detect it. If successfully detected, you can specify its diameter and calibrate the image (see “To click on a point on the sphere to detect it” on page 72).
- Manually outline the calibration sphere – Use the circle tool to outline the calibration sphere, enter its known diameter and calibrate the image (see “To manually outline the calibration sphere” on page 69).

If a calibration sphere does not exist on the image, you can use one of the following calibration methods:

- Draw Line – Draw a line on the image and enter the distance in mm (see “Calibrating Images by Drawing a Line” on page 69).
- Enter magnification factor – Type a value (i.e., greater than 0%) for the magnification factor to calibrate the image. To use this option, the image must have a pixel spacing value in its DICOM header (i.e., application displays a caliper in the image viewport). For details, see “Calibrating Images by Entering a Magnification Factor” on page 71.

The Main Review window displays the text marker, “Image is manually calibrated,” in the viewport for all images that have been calibrated.



Correct the magnification of the image before you perform any measurements. When you use the Correct Magnification tool, the application removes any existing measurements from the image.

Chapter 11: Using the Review and Ortho Tools

Correcting Image Magnification (continued)



Always check a marker of known size on the images to verify that the images have been calibrated correctly.

To ensure correct image calibration, make sure that fiducial markers (e.g., calibration spheres) were placed at the level of the anatomy.

When calibrating images acquired in an oblique plane, the scale may not be constant across the entire image, because of perspective projection. The degree of scale inconsistency depends on the distance the x-ray source was moved away from the center of the image at the time of acquisition.



You cannot perform any measurements, calibrate nor view an image in true size if an image has non-square pixels.

Understanding Pixel Spacing

When you load images for review, the application obtains the pixel spacing from the images and reflects it in the viewports as follows:

- “Measured Size is Modality Calibrated” — X-ray scaling is determined based on the information provided in the image from the modality. Scaling is determined using the DICOM tag Pixel Spacing (0028,0030).
- “Measured Size is Modality Magnified” — X-ray scaling is determined based on information available from the image. The image uses the DICOM tags Imager Pixel Spacing (0018,1164) divided by the Estimated Radiographic Magnification Factor (0018,1114).
- “Measured Size is at Detector” — The image has not been corrected for any X-ray scaling. The image uses the DICOM tag Imager Pixel Spacing (0018,1164).
- “Measured Size is User Calibrated” — The pixel spacing is retrieved from the saved plan, based on a calibration performed either in Sound-Eklin® Orthoplan Elite® or another application which supports GSPS. The scaling factor is stored in the DICOM tag Presentation Pixel Spacing (0070,0101).

Calibrating Images by Drawing a Line

You can use the following procedure to calibrate the image if there is a landmark or fiducial marker of a known distance on the image.

To calibrate the caliper in an image by drawing a line



The application only applies the calibration to the image in the selected viewport (i.e., the viewport with a yellow border).

We recommend that you enlarge the size of the image on the screen to easily identify the fiducial.

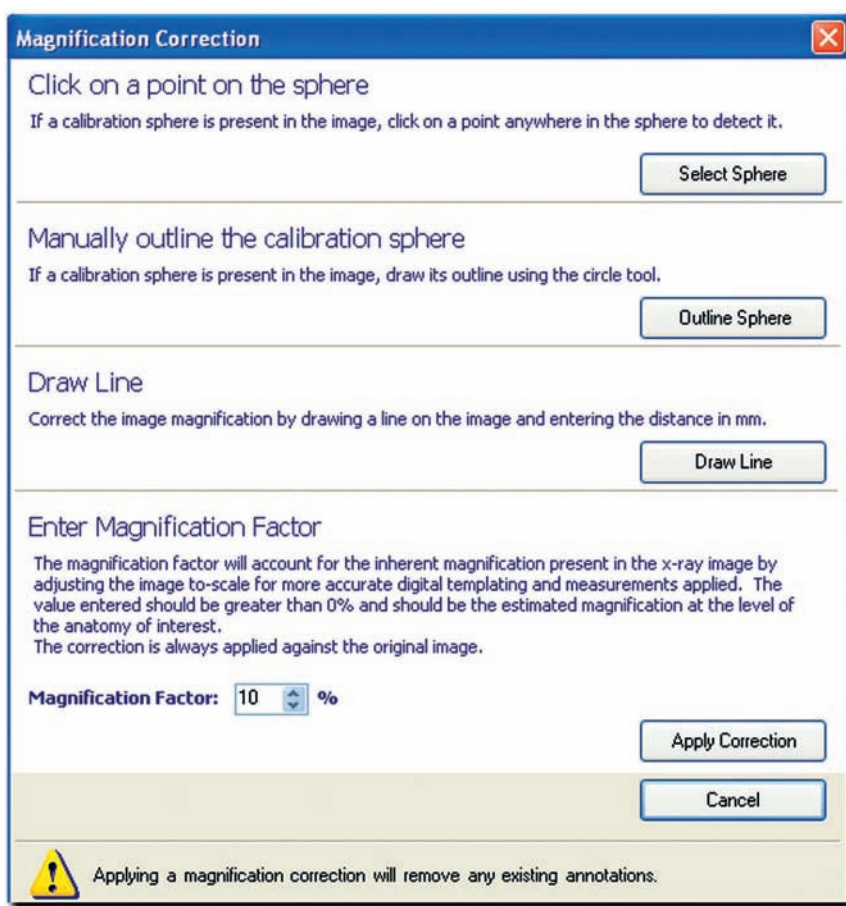
Chapter 11: Using the Review and Ortho Tools

Correcting Image Magnification (continued)

1. In the Ortho toolbar, click the Select button, then click the viewport whose image you want to calibrate.



2. Do one of the following:
 - From the Measurements menu, click **Magnification Correction**.
 - In the Ortho toolbar, click the **Magnification Correction** button.

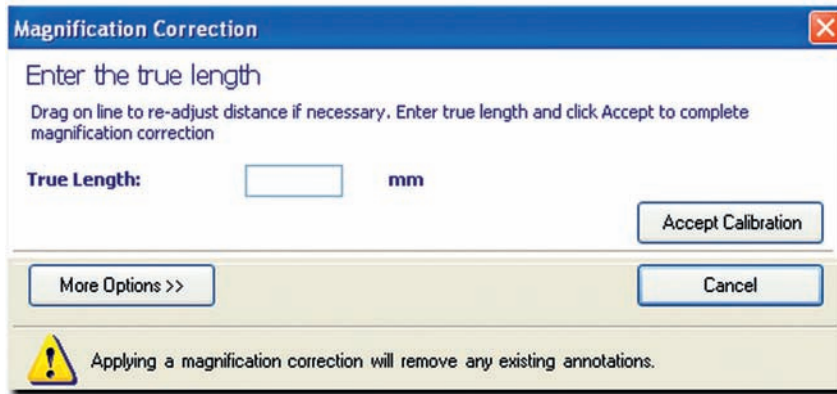
A screenshot of the 'Magnification Correction' dialog box. The dialog has a blue title bar with the text 'Magnification Correction' and a close button. It contains four sections: 1. 'Click on a point on the sphere' with a description and a 'Select Sphere' button. 2. 'Manually outline the calibration sphere' with a description and an 'Outline Sphere' button. 3. 'Draw Line' with a description and a 'Draw Line' button. 4. 'Enter Magnification Factor' with a description, a 'Magnification Factor' input field set to '10', and a percentage sign. At the bottom are 'Apply Correction' and 'Cancel' buttons. A warning icon and text are at the very bottom: 'Applying a magnification correction will remove any existing annotations.'

3. Click **Draw Line**.
4. On the image, click two points to draw a line over an item of which you know the length (e.g., a scanned caliper).

Chapter 11: Using the Review and Ortho Tools

Correcting Image Magnification (continued)

5. In the Enter True Distance in mm dialog box, type the length of the line in millimeters and click **Accept Calibration**.



6. The application calibrates the caliper displayed in the viewport and displays the text marker, "Image is manually calibrated".

Calibrating Images by Entering a Magnification Factor

The magnification factor accounts for the inherent magnification present in the x-ray image by adjusting the image to-scale for more accurate digital templating and measurements. The value you enter must be greater than 0% and should be the estimated magnification at the level of the anatomy of interest. The correction is always applied against the original image.



To use this calibration method, the image must have a pixel spacing value in its DICOM header (i.e., application displays a caliper in the image viewport). For images without a known pixel spacing value (e.g., secondary captures), you must use the Draw Line calibration method (see "Calibrating Images by Drawing a Line" on page 65).

To calibrate an image by entering an additional magnification factor



The application only applies the calibration to the image in the selected viewport (i.e., the viewport with a yellow border).

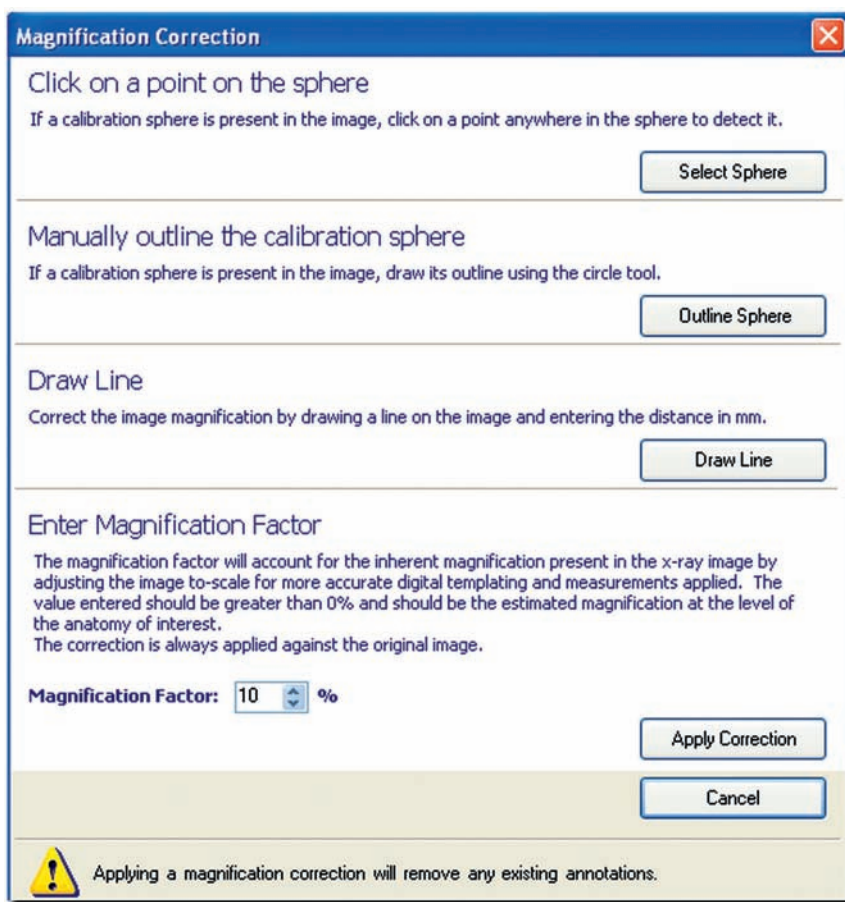
1. In the Ortho toolbar, click the **Select** button, then click the viewport whose image you want to calibrate.



Chapter 11: Using the Review and Ortho Tools

Correcting Image Magnification (continued)

2. Do one of the following:
 - From the Measurements menu, click **Magnification Correction**.
 - In the Ortho toolbar, click the **Magnification Correction** button.



3. In the Magnification Factor field, type the magnification factor in percentage. You can also use the up and down arrow buttons to adjust the value by 1% increments.
4. Click **Apply Correction**.
5. The application re-calibrates the caliper displayed in the viewport and displays the text marker, "Image is manually calibrated".

Chapter 11: Using the Review and Ortho Tools

Correcting Image Magnification (continued)

Calibrating Images Using a Calibration Sphere

If a calibration sphere exists on the image, you can use this calibration method. The application supports calibration spheres that are of the following diameters:

- 1 inch; and
- 25 millimeters.



To use this calibration method, the image must have a pixel spacing value in its DICOM header (i.e., application displays a caliper in the image viewport). For images without a known pixel spacing value (e.g., secondary captures), you must use the Draw Line calibration method (see “Calibrating Images by Drawing a Line” on page 65).

To calibrate the image using a calibration sphere



The application only applies the calibration to the image in the selected viewport (i.e., the viewport with a yellow border).

We recommend that you enlarge the size of the image on the screen to easily identify the calibration sphere.

1. In the Ortho toolbar, click the Select button, then click the viewport whose image you want to calibrate.



2. Do one of the following:

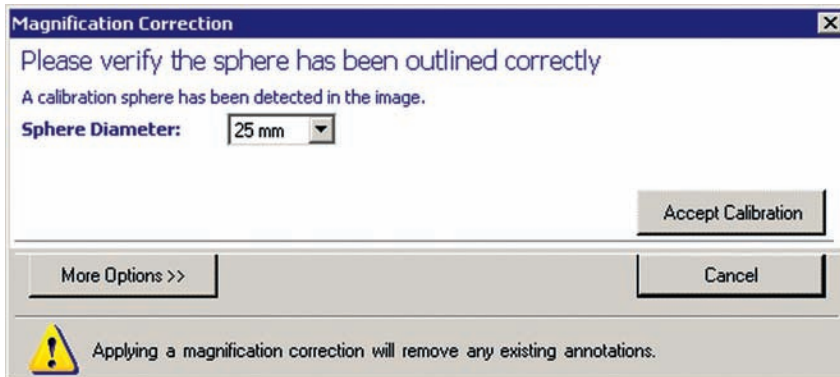
- From the Measurements menu, click **Magnification Correction**.
- In the Ortho toolbar, click the **Magnification Correction** button.



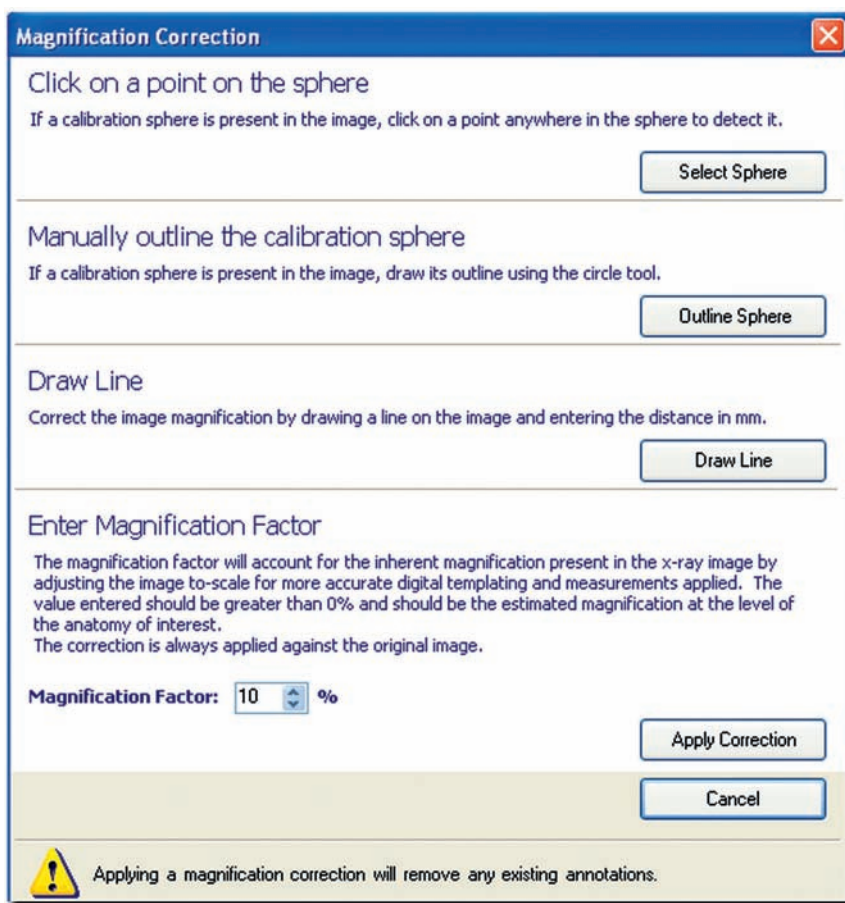
Chapter 11: Using the Review and Ortho Tools

Correcting Image Magnification (continued)

3. The application attempts to detect the calibration sphere. Depending on the outcome, the application can display the following dialog boxes.
 - If the application detects a calibration sphere, it outlines the sphere in the viewport and displays the following dialog box:



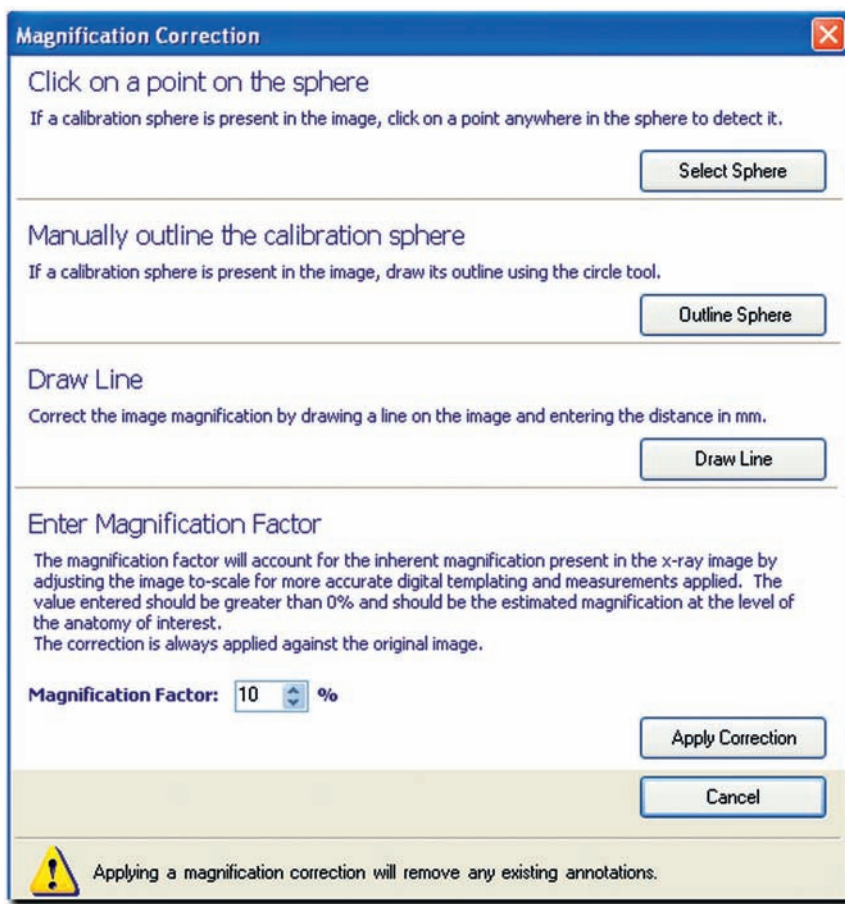
- If the application fails to detect the calibration sphere, it displays the following dialog box:



Chapter 11: Using the Review and Ortho Tools

Correcting Image Magnification (continued)

4. The application displays the following dialog box:



5. Do one of the following:
- To manually detect the sphere, see “To click on a point on the sphere to detect it” on page 72; or
 - To manually outline the sphere, see “To manually outline the calibration sphere” on page 72.
6. Do one of the following:
- If the calibration sphere is correctly detected, proceed to Step 7
 - If the calibration sphere is incorrectly detected or not detected at all, see “To click on a point on the sphere to detect it” on page 72 or “To manually outline the calibration sphere” on page 72.
7. Use the “Sphere Diameter” drop down menu to select the appropriate sphere diameter (i.e., either 25 mm or 1 inch).
8. Click **Accept Calibration**.
9. The application calibrates the caliper displayed in the viewport and displays the text marker, “Image is manually calibrated”.

Chapter 11: Using the Review and Ortho Tools

Correcting Image Magnification (continued)

To click on a point on the sphere to detect it

1. In the Magnification Correction dialog box, ensure that More Options are displayed.
2. Click **Select Sphere**.
3. Click anywhere inside the sphere.
4. If the application outlines the sphere in the viewport. Do the following:
 - Use the “Sphere Diameter” drop down menu to select the appropriate sphere diameter (i.e., either 25 mm or 1 inch).
 - Click **Accept Calibration**.
 - The application calibrates the caliper displayed in the viewport and displays the text marker, “Image is manually calibrated”.
5. If the application does not detect the sphere, repeat Step 2 through Step 4. Alternatively, you can manually outline the calibration sphere (see “To manually outline the calibration sphere” on page 72).

To manually outline the calibration sphere

1. In the Magnification Correction dialog box, ensure that More Options are displayed.
2. Click **Outline Sphere**.
3. Click two points on the leading edge of the calibration sphere.
4. When you click the second point, the application draws a circle.
5. Drag the mouse pointer to specify the size of the sphere. Notice how the circle changes as you move the mouse pointer.
6. Click the third point to complete the outline.
7. Use the “Sphere Diameter” drop down menu to select the appropriate sphere diameter (i.e., either 25 mm or 1 inch).
8. Click **Accept Calibration**.
9. The application calibrates the caliper displayed in the viewport and displays the text marker, “Image is manually calibrated”.

Chapter 11: Using the Review and Ortho Tools *(continued)*

Zooming Images

You can zoom the images to examine them more closely.

To zoom images using the mouse

1. Do one of the following:
 - From the Tools menu, click **Zoom**.
 - In the Review toolbar, click the **Zoom** button.



2. Click and drag the mouse vertically over the image to zoom in and out. If you have a mouse wheel, you can rotate the mouse wheel away from you to zoom in and towards you to zoom out.

To zoom images using presets

1. Do one of the following:
 - From the Tools menu, click **Zoom Presets**.
 - In the Review toolbar, click the **Zoom Preset** button.



2. Select the desired preset from the menu.
 - **Zoom 110%, Zoom 200%, Zoom 300%, Zoom 400%** – One and one tenth (1.1), two, three and four times the current viewport size, respectively.
 - **Full Resolution** – Displays the images at their acquired resolution (i.e., a 256x256 image is displayed at 256x256 pixels).
 - **True Size** – Displays the image at the same size as the physical size of the body part. This is most useful for plain film studies and will be disabled if the image does not contain pixel size information or if your monitor has not been calibrated. Contact your System Administrator if your monitor has not been calibrated.

Chapter 11: Using the Review and Ortho Tools *(continued)*

Panning Images

You can pan or reposition the image within a viewport.

To pan an image

1. Do one of the following:
 - From the Tools menu, click **Pan**.
 - In the Review toolbar, click the **Pan** button.



2. Click and drag the image to change its position in the viewport. If you have a mouse wheel, you can rotate the mouse wheel away from you to scroll up and towards you to scroll down.

Changing the Image Brightness & Contrast

You can change the brightness and contrast of the images. The contrast can be wide (many grays, less contrast) or narrow (fewer grays, more contrast). The brightness can be high (dark) or low (bright).



You cannot change the window settings for color images.

You can adjust the window settings using the mouse.

To change the window settings using the mouse

1. Do one of the following:
 - From the Tools menu, click **Brightness/Contrast**.



- In the Review toolbar, click the **Brightness/Contrast** button.
2. Adjust the window width and/or level as follows:
 - Click and drag the mouse vertically over the selected image to adjust the window level.
 - Click and drag the mouse horizontally over the image to adjust the window width.



If you have a mouse wheel, you can rotate the mouse wheel to adjust the window level.

Chapter 11: Using the Review and Ortho Tools *(continued)*

Changing the Image Orientation

You can flip the images on the horizontal axis, as well as rotate the images.



If you have the Sound-Eklin® Orthoplan Elite® X-Stitch module, you can load the rotated images into the module without losing your changes.

To rotate an image to an arbitrary angle

1. Do one of the following:
 - From the Tools menu, click **Rotate**.
 - In the Review toolbar, click the **Rotate** button.



2. Click an image and drag the mouse pointer to rotate the image to the required angle.

To flip an image

1. Click the viewport with the image you want to flip.
2. Do one of the following:
 - From the Tools menu, click **Flip**.
 - In the Review toolbar, click the **Flip** button.



The application only flips images horizontally (i.e., on the x-axis).

Inverting the Image Grayscale

Inverting the image grayscale provides negative image display.



You cannot invert the image grayscale on color images. To invert the image grayscale

1. Do one of the following:
 - From the Tools menu, select **Invert Grayscale**.
 - In the Review Toolbar, click the **Invert Grayscale** button.



2. The application inverts the image grayscale.
3. Click the button again to return to the original setting.

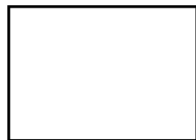
Chapter 11: Using the Review and Ortho Tools *(continued)*

Changing the Image Layout

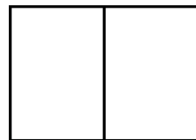
You can change the layout of the images to suit your viewing needs.

To change the layout

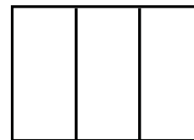
1. Do one of the following:
 - From the View menu, select **Layout** and click one of the predefined image layouts.
 - In the Review toolbar, click the Layout button and click one of the predefined image layouts.



1x1



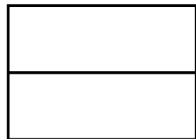
1x2



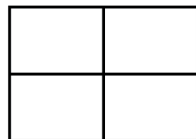
1x3



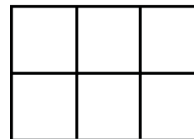
1x4



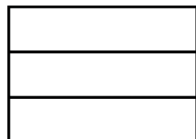
2x1



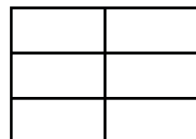
2x2



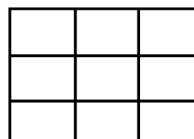
2x3



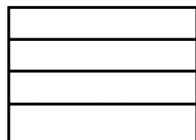
3x1



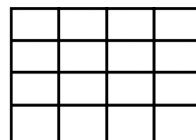
3x2



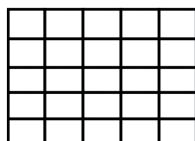
3x3



4x1



4x4



5x5

Chapter 11: Using the Review and Ortho Tools *(continued)*

Magnifying Images

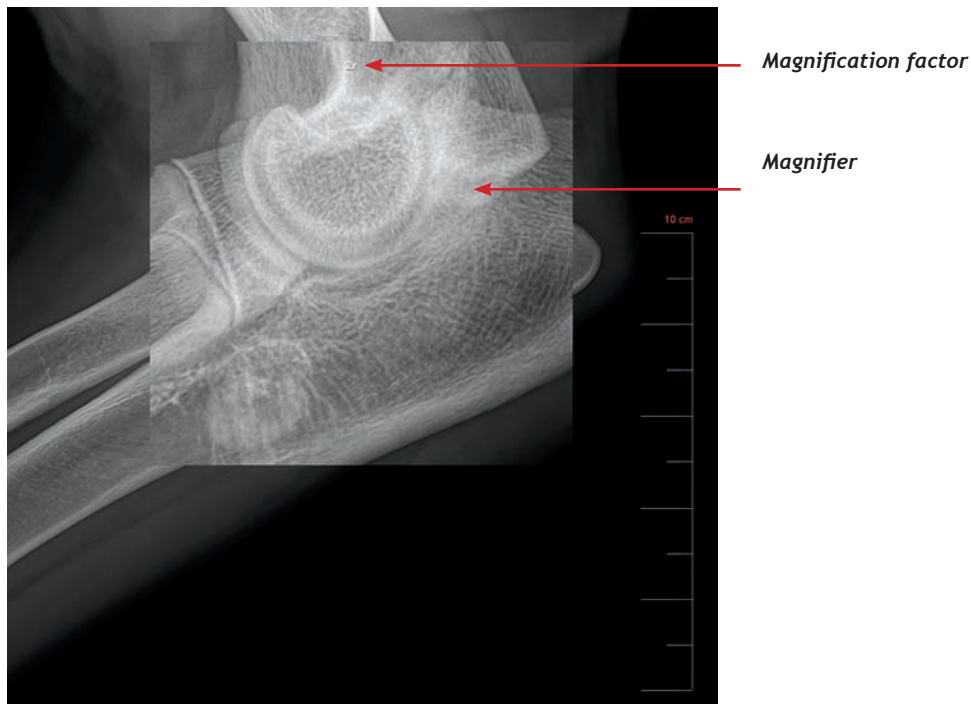
A magnifier is provided so that you can magnify specific areas of interest on the images.

To magnify a selected area in an individual image

1. Do one of the following:
 - From the Tools menu, click **Magnify**.
 - In the Review toolbar, click the **Magnify** button.



2. Click the area that you wish to magnify. Drag the mouse to magnify another area of interest. The application displays the magnification factor in the top of the magnifier.



3. While magnifying an area of interest (i.e., with the mouse button pressed), you can change the magnification factor using the mouse wheel or the right mouse button:
 - Rotate the mouse wheel away from you to increase the magnification factor (up to 6x) or towards you to decrease the magnification factor (down to 2x).
 - Right-click to cycle through the magnification settings (i.e., from 2x to 3x, 4x, 5x, 6x and back to 2x).
4. When you release the mouse button, then press the button again to use the magnifier, the magnification factor resets to 2x.

Chapter 11: Using the Review and Ortho Tools *(continued)*

Changing the Text Level

The text level is the level of information that the application displays in the image viewports, sometimes called the overlay text or image text. You can choose one of three levels:

- None – Shows no information.
- Basic – Shows only the basic text annotations.
- Full – Displays the patient name, W/L settings, compression ration, series number, and image number.

To change the text level

1. Do one of the following:
 - From the Tools menu, select **Text Information Level** then click the desired text level.
 - In the Review toolbar, click the **Text Information Level** button and select the desired text level.



Performing Image Relation

You can define a geometric relationship between multiple images, allowing you to perform continuous measurements across them.



When using the Image Relation tool, ensure that the images are acquired using a common reference system and identical patient positioning.

To ensure accurate results, the images must be calibrated correctly before you perform image relation (see “Correcting Image Magnification” on page 64).



You cannot perform any measurements, calibrate nor view an image in true size if an image has non-square pixels.

Chapter 11: Using the Review and Ortho Tools

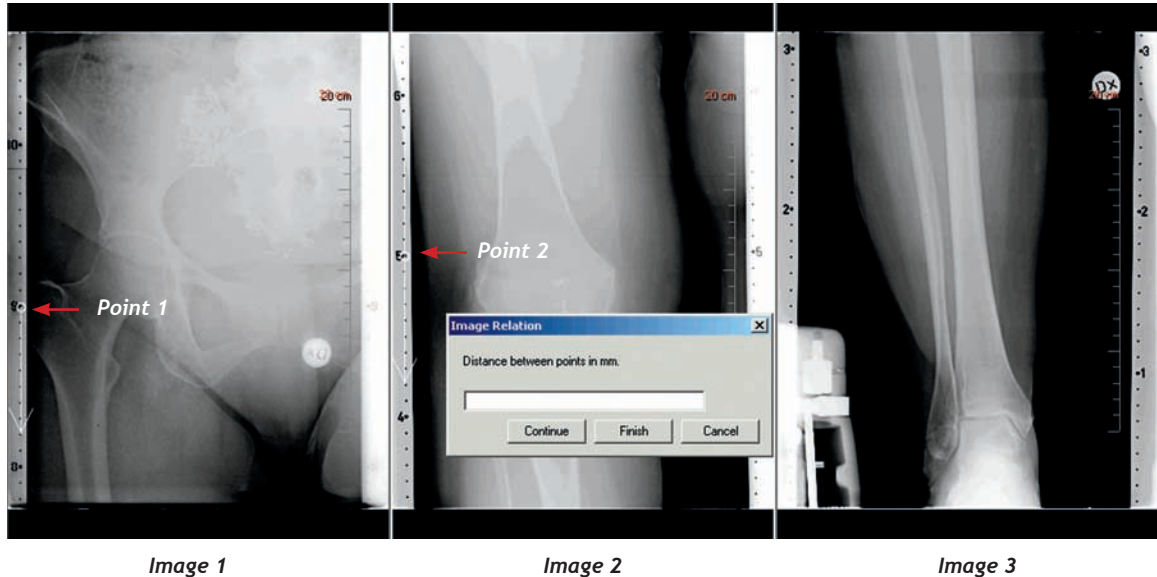
Performing Image Relation (*continued*)

To perform a continuous image relation

1. Ensure that the Main Review window is using a viewport layout that shows the images that you want to relate (see “Changing the Image Layout” on page 76).
2. Do one of the following:
 - From the Measurements menu, click **Image Relation**.
 - In the Ortho toolbar, click the **Image Relation** button.



3. The example below shows a continuous set of images referenced by rulers. To relate images 1 and 2, do the following:
 - In image 1, click on a point. This should be a known location in the image (e.g., a ruler). Adjust the arrow to point in the direction of the next image and click the image again. This creates point 1 as shown below.
 - In image 2, click on a point. This should be a known location in the image (e.g., a ruler). Adjust the arrow to point in the same direction as the arrow in the first image and click the image again. This creates point 2 as shown below.

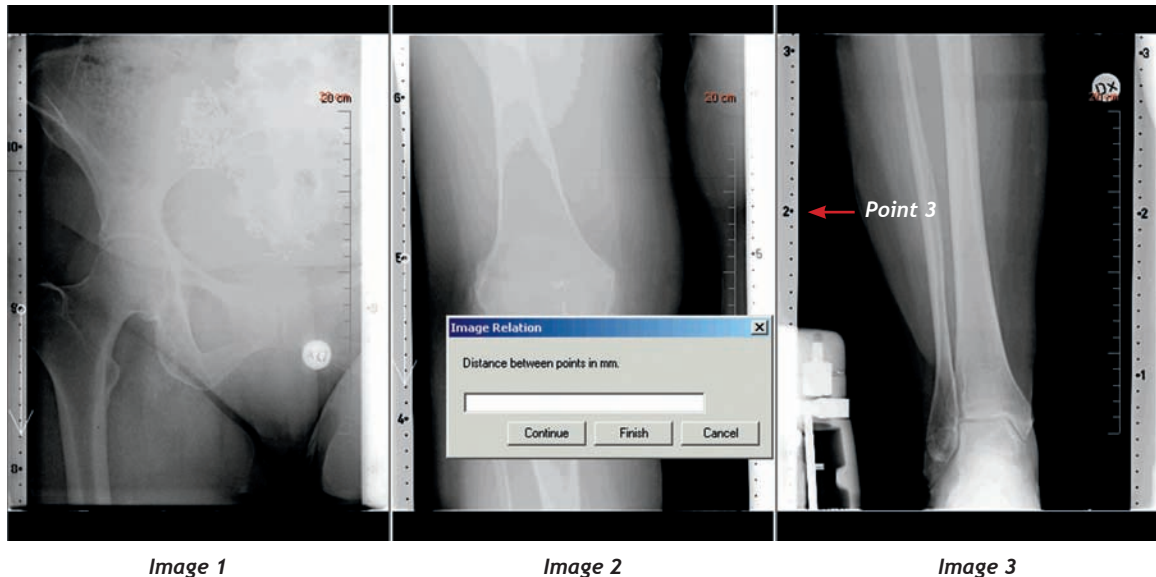


4. In the Image Relation dialog box, type the distance between the two points in millimeters using the ruler as a reference. Type 0 if the landmarks are a common point on the images (i.e., the images are overlapping); otherwise, type the known distance between the two landmarks.
5. Click **Continue** to relate images 2 and 3.

Chapter 11: Using the Review and Ortho Tools

Performing Image Relation (*continued*)

6. In image 3, click on a point. This should be a known location in the image (e.g., a ruler). Adjust the arrow to point in the same direction as the arrow in the second image and click the image again. This creates point 3 as shown below.



7. In the Image Relation dialog box, type the distance between points 2 and 3 in millimeters using the ruler as a reference. Type 0 if the landmarks are a common point on the images (i.e., the images are overlapping); otherwise, type the known distance between the two landmarks.
8. Click **Finish**.
9. The application now views the three images as if they are one so you can perform measurements across the images.

Drawing & Displaying Ortho Measurements

This section describes how to use the various orthopaedic measurement tools provided in the Ortho toolbar. The application displays all measurements in metric units. For information on manipulating and modifying the measurements, see “Editing an Ortho Measurement” on page 98.



*At any time, you can drag a measurement to another location. You can hold the **SHIFT** key to select multiple measurements and move them at the same time.*

*To stop or cancel an ortho measurement before it completes, press the **ESC** key or click the **Select** button in the Ortho toolbar.*



*The selected ortho tool remains active until you select a different tool or click the **Select** button in the Ortho toolbar.*

Chapter 11: Using the Review and Ortho Tools

Drawing & Displaying Ortho Measurements (*continued*)

The Sound-Eklin® Orthoplan Elite® application considers images that do not have a pixel spacing value defined in their DICOM headers (e.g., secondary captures) as uncalibrated images. If you do not calibrate these images, the Ortho tools are unavailable. To calibrate these images, use the Draw Line option in the Correct Magnification tool (see “Correcting Image Magnification” on page 64).



To ensure accurate results, the images must be calibrated correctly before you draw ortho measurements (see “Correcting Image Magnification” on page 64).



You cannot perform any measurements, calibrate nor view an image in true size if an image has non-square pixels.

Highlighting a Location on the Anatomy

If there is a location on the anatomy that is of interest, you can mark it with an arrow to highlight its location.

To insert an arrow indicator

1. Do one of the following:
 - From the Tools menu, click Arrow Indicator.
 - In the Ortho toolbar, click the Arrow Indicator button.



2. Click the area of interest (i.e., the point in the image that you want to highlight), then drag the mouse away to draw the arrow.

Displaying a Distance

Use the Distance tool to measure the distance between two points.

To display the distance

1. Do one of the following:
 - From the Measurements menu, click Distance.
 - In the Ortho toolbar, click the Distance button.



2. Click two points on the image.
3. The application draws a straight line and displays the distance between the two points in millimeters.

Chapter 11: Using the Review and Ortho Tools

Drawing & Displaying Ortho Measurements (*continued*)

Drawing an Angle

Use the Angle tool to draw and measure an angle between three points. You can choose to display the measurements for a normal, reflex or supplementary angle.

To draw an angle

1. Do one of the following:
 - From the Measurements menu, click Angle.
 - In the Ortho toolbar, click the Angle button.



2. Click three points on the image.
3. The application displays the angle's inside measurement in degrees. By default, the application displays the Normal, or inside, angle measurement. To display the reflex and supplementary angles, See Table 11.1 on page 101.

To measure an angle using an existing line

1. Do one of the following:
 - From the Measurements menu, click Angle.
 - In the Ortho toolbar, click the Angle button.



2. Press CTRL and select the first line and drag the mouse to position the second line.
3. The application displays the angle's inside measurement in degrees. By default, the application displays the Normal, or inside, angle measurement. To display the reflex angle, See Table 11.1 on page 101.

Chapter 11: Using the Review and Ortho Tools

Drawing & Displaying Ortho Measurements (*continued*)

Measuring a Cobb Angle

Use the Cobb's Angle tool to measure the angle where two lines intersect. It is a tool most commonly used to determine the degree of Scoliosis.

To measure a Cobb angle

1. Do one of the following:
 - From the Measurements menu, click **Cobb's Angle**
 - In the Ortho toolbar, click the **Cobb's Angle** button.



2. Click two points on the image to create a line.
3. Click two more points to create the second line.
4. The application extrapolates the point where the two lines intersect and displays the Cobb Angle.

To measure the Cobb angle of existing lines

1. Do one of the following:
 - From the Measurements menu, click **Cobb's Angle**
 - In the Ortho toolbar, click the **Cobb's Angle** button.



2. Press **CTRL** and select the first line.
3. Do one of the following:
 - Select the second line.
 - Click two points to create the second line.
4. The application extrapolates the point where the two lines intersect and displays the Cobb Angle.

Chapter 11: Using the Review and Ortho Tools

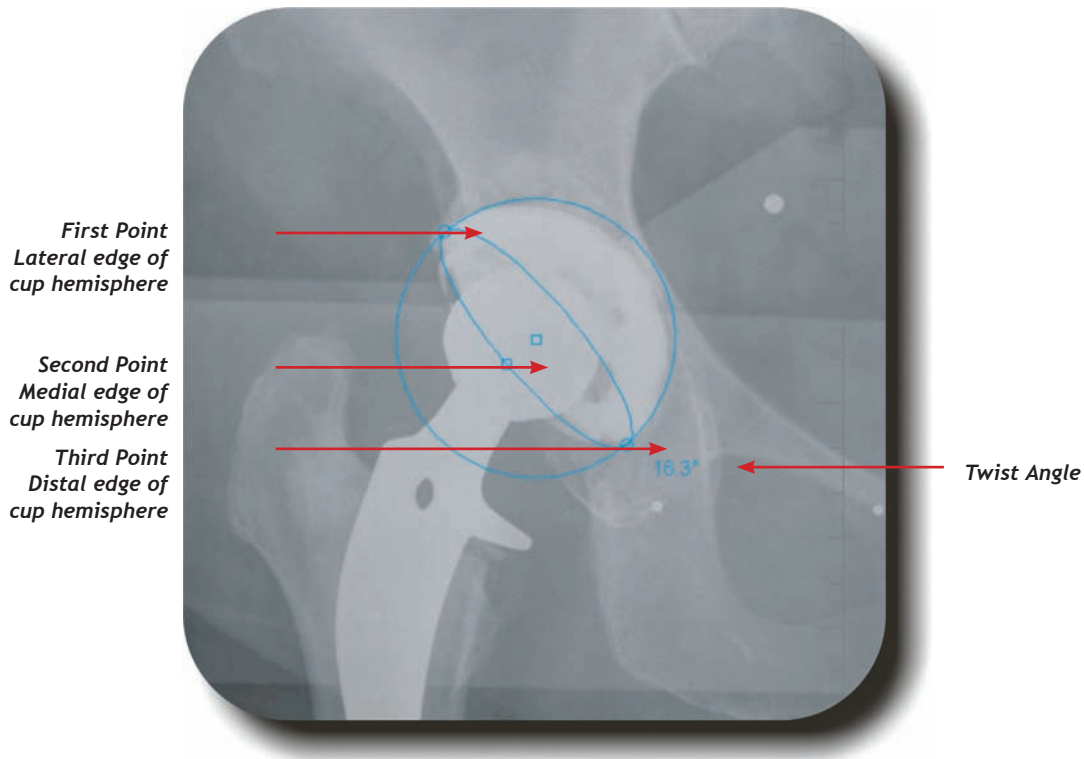
Drawing & Displaying Ortho Measurements (*continued*)

Measuring the Twist Angle

The twist angle measurement is used to measure the post-operative anteversion/retroversion of the acetabular cup.



To accurately measure the Twist Angle, the image must be an AP pelvic image.



To measure the Twist Angle

1. Do one of the following:
 - From the **Measurements** menu, click **Twist Angle**.
 - In the Ortho toolbar, click the **Twist** button.



2. Click the First Point – lateral edge of the acetabular cup hemisphere.
3. Click the Second Point – medial edge of the acetabular cup hemisphere.
4. Click the Third Point – distal edge of the acetabular cup hemisphere.
5. The application calculates and displays the Twist Angle.

Chapter 11: Using the Review and Ortho Tools

Drawing & Displaying Ortho Measurements (*continued*)

Drawing a Circle

Use the Circle tool to measure the diameter, circumference and surface area of a circular area.

To draw a circle

1. Do one of the following:
 - From the **Measurements** menu, click **Circle**.
 - In the Ortho toolbar, click the **Circle** button.



2. Click two points on the image.
3. When you click the second point, the application draws a circle.
4. Drag the mouse pointer to specify the size of the circle. Notice how the circle changes as you move the mouse pointer.
5. Click the third point to complete the circle.

Drawing an Outline

Use the Outline tool to draw an outline around a region of interest. From the outlined region, you can:

- measure the circumference and surface area of the outlined region.; or
- create a cut out or outline (see “Using the Cut and Copy Feature” on page 93).

To draw an outline

1. Do one of the following:
 - From the Measurements menu, click **Outline**.
 - In the Ortho toolbar, click the **Outline** button.



2. Click a series of points to create the outline. An outline must have at least three points.
3. Click the first point to complete the outline.

Chapter 11: Using the Review and Ortho Tools

Drawing & Displaying Ortho Measurements (*continued*)

Drawing Perpendicular Lines

Use the Perpendicular Lines tool to draw two perpendicular lines.

To draw perpendicular lines

1. Do one of the following:
 - From the Measurements menu, click **Perpendicular Lines**.
 - In the Ortho toolbar, click the **Perpendicular Lines** button.



2. Click two points on the image to draw a straight line.
3. Click the third point to set the perpendicular line position.
4. You can adjust the length and location of the first line and the perpendicular line.



When Snap to Line is selected in the Ortho popup menu (See Table 11.1 on page 101), you cannot extend the perpendicular line beyond the point where it meets the first line.

To draw a perpendicular line based on an existing line

1. Do one of the following:
 - From the **Measurements** menu, click **Perpendicular Lines**.
 - In the Ortho toolbar, click the **Perpendicular Lines** button.
2. Press CTRL and select the existing line.
3. Click to set the perpendicular line position.

Drawing Parallel Lines

Use the Parallel Lines tool to draw two parallel lines and measure the distance between the lines.

To draw parallel lines

1. Do one of the following:
 - From the Measurements menu, click **Parallel Lines**.
 - In the Ortho toolbar, click the **Parallel Lines** button.



2. Click two points on the image to draw a straight line.

Chapter 11: Using the Review and Ortho Tools

Drawing & Displaying Ortho Measurements (*continued*)

3. Click a point on the image to indicate the location of the parallel line.
The application draws a second parallel line automatically.
4. You can do the following:
 - Click and drag the first line, not one of the end points, to set the line position.
 - Click and drag the parallel line to adjust its location.



If you reposition the first line, the second line moves with it; however, if you reposition the second line, the first line stays where you drew it.

To draw a parallel line based on an existing line

1. Do one of the following:
 - From the Measurements menu, click Parallel Lines.
 - In the Ortho toolbar, click the Parallel Lines button.



2. Press CTRL and select the existing line.
3. Click to position the parallel line.
4. You can do the following:
 - Click and drag the first line, not one of the end points, to set the line position.
 - Click and drag the parallel line to adjust its location.



If you reposition the first line, the second line moves with it; however, if you reposition the second line, the first line stays where you drew it.

Drawing a Midline

Use the Midline tool to display a middle line between two lines.

To draw a midline

1. Do one of the following:
 - From the Measurements menu, click **Midline**.
 - In the Ortho toolbar, click the **Midline** button.



2. Click two points on the image.

Chapter 11: Using the Review and Ortho Tools

Drawing & Displaying Ortho Measurements (*continued*)

3. The application displays a mid-point between the two points.
4. Click two more points on the image.
5. When you click the last point, the application draws the midline from the mid-point of the first pair of points to the mid-point of the second pair of points.

To draw a midline of existing lines

1. Do one of the following:
 - From the **Measurements** menu, click **Midline**.
 - In the Ortho toolbar, click the **Midline** button.



2. Press **CTRL** and select the first line.
3. Do one of the following:
 - Select the second line.
 - Click two points to create the second line.
4. The application draws the midline from the mid-point of the first pair of points to the midpoint of the second pair of points.

Drawing an Intersection Point

Use the Intersection Point tool to display the intersection point between two lines.

To draw an intersection point

1. Do one of the following:
 - From the Measurements menu, click **Intersection Lines**.
 - In the Ortho toolbar, click the **Intersection Lines** button.



2. Click two different points on the image to create the first line. The application draws a line between the two points.
3. Click a third point to begin the second line. The application displays a line connected to the mouse pointer. The application also displays a floating point, not connected to either line, which shows where the two lines would intersect.
4. Click the fourth point, to complete the second line. The application establishes the floating point position to show the intersection point of the two lines.

Chapter 11: Using the Review and Ortho Tools

Drawing & Displaying Ortho Measurements (*continued*)

To draw an intersection point between existing lines

1. Do one of the following:
 - From the **Measurements** menu, click **Intersection Lines**.
 - In the Ortho toolbar, click the **Intersection Lines** button.



2. Press **CTRL** and select the existing line.
3. Do one of the following:
 - Select the second line. The application establishes the floating point position to show the intersection point of the two lines.
 - Click a point to begin the second line. The application displays a line connected to the mouse pointer. The application also displays a floating point, not connected to either line, which shows where the two lines would intersect. Click a point, to complete the second line. The application establishes the floating point position to show the intersection point of the two lines.

Creating a Mid Point

Use the Mid Point tool to display the mid point between two points.

To create a mid point

1. Do one of the following:
 - From the **Measurements** menu, click **Mid Point**.
 - In the Ortho toolbar, click the **Mid Point** button.



2. Click two points on the image.
3. The application draws a line with the mid point marked in the center.



When Snap to Middle is selected in the Ortho popup menu (See Table 11.1 on page 101), the mid point does not move.

To create a mid point of an existing line

1. Do one of the following:
 - From the **Measurements** menu, click **Mid Point**.
 - In the Ortho toolbar, click the **Mid Point** button.



Chapter 11: Using the Review and Ortho Tools

Drawing & Displaying Ortho Measurements (*continued*)

2. Press CTRL and select the existing line.
3. The application marks the mid point in the center of the line.

Comparing Distances

Use the Compare Distance tool to compare the distance between two lines.

The Compare Distance tool offers three types of measurements:

- Difference – The difference between two lines (in millimeters).
- Sum – The total length of two lines (in millimeters).
- Ratio – The ratio between two lines (in percentage).

To compare two lines

1. Do one of the following:
 - From the Measurements menu, click **Compare Distances**.
 - In the Ortho toolbar, click the **Compare Distances** button.



2. Click two points on the image to draw the first line.
3. Click two points on the image to draw the second line.
4. By default, the application marks the first line with the letter a, and the second line with the letter b, and displays the difference between lines a and b (e.g., a-b=23.1mm).
5. To change the calculation, right-click the results (e.g., a-b=23.1mm) then click the desired calculation from the popup menu (i.e., Difference, Sum or Ratio).
6. You can also change the labels (i.e., the letters a and b) beside each line to describe the measurement and add a prefix to the results (see “Editing Labels and Adding Text Prefixes” on page 91).

Comparing Angles

Use the Compare Angles tool to compare two angles. The Compare Angles tool offers three types of measurements:

- Difference – The difference between two angles (in degrees).
- Sum – The total degree measurement of two angles (in degrees).
- Ratio – The ratio between two angles (in percentage).

Chapter 11: Using the Review and Ortho Tools

Drawing & Displaying Ortho Measurements (*continued*)

To compare angles

1. Do one of the following:
 - From the Measurements menu, click **Compare Angles**.
 - In the Ortho toolbar, click the **Compare Angles** button.



2. Click three points on the image to draw the first angle.
3. Click three points on the image to draw the second angle.
4. By default, the application marks the first angle with the letter a, and the second angle with the letter b, and displays the difference between angles a and b (e.g., $a-b=13.7^\circ$).
5. To change the calculation, right-click the results (e.g., $a-b=13.7^\circ$) then click the desired calculation from the popup menu (i.e., Difference, Sum or Ratio).
6. You can also change the labels (i.e., the letters a and b) beside each angle to describe the measurement and add a prefix to the results (see “Editing Labels and Adding Text Prefixes” on page 91).

Editing Labels and Adding Text Prefixes

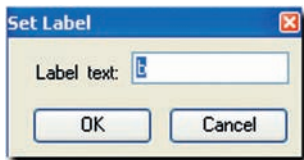
When you use the Compare Distances and Compare Angles tools, you can edit the default labels (i.e., a and b) assigned to a line or angle, and add a prefix to the result (e.g., $ab=23.1\text{mm}$) of the comparison.



The following procedures only apply to the Compare Distances and Compare Angles tools.

To change measurement labels

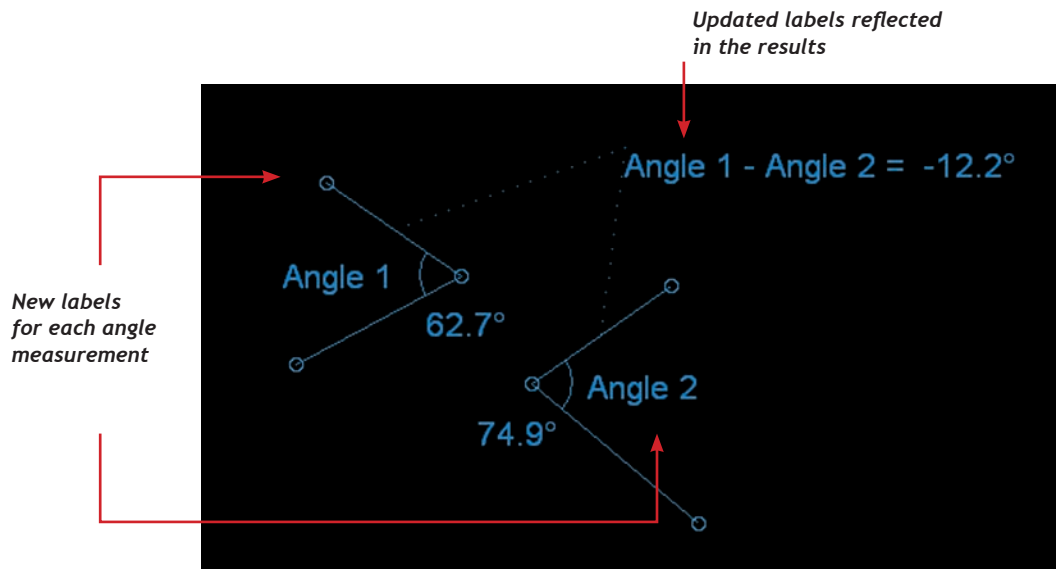
1. Right-click a label and click **Set Text** from the popup menu.
2. In the Label Text field, type a new name for the label (e.g., Angle 1) and click **OK**.



Chapter 11: Using the Review and Ortho Tools

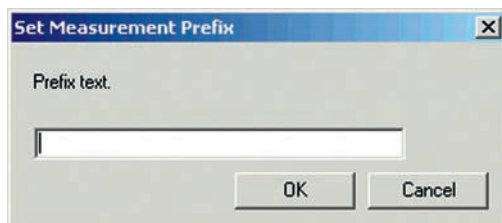
Drawing & Displaying Ortho Measurements (*continued*)

3. Perform Steps 1 through 2 for each measurement. The following is an example of new labels assigned to two angle measurements. The results also reflect the changes to the labels.



To add a prefix to a result

1. Right-click the results and click **Set Text Prefix** from the popup menu.
2. In the Prefix Text field, type a prefix for the results (e.g., Difference between two lines) and click **OK**.



3. The following is an example of a prefix added to a measurement result.

Chapter 11: Using the Review and Ortho Tools *(continued)*

Using the Cut and Copy Feature

The Cut and Copy features are helpful for planning procedures. For example, the length of a leg may shorten due to arthritic hips. When planning the hip surgery, you can use the Cut or Copy feature to correct the length of the leg while planning the placement and size of a hip implant. The Cut or Copy feature can also help you to correct a bone fracture virtually, and determine the length of the nail or plate required for a surgery (see “Locking an End-Point to a Cut or Copy” on page 95).



Only use the Cut and Copy features for CR, DX, RG, SC modalities.

Do not use the Cut or Copy features in conjunction with automatic templating. Prefix added to the results 101 Chapter 7

Creating a Cut or Copy

A copy duplicates or outlines a selected area which you can reposition or rotate to simulate corrections such as a fracture reduction, deformity correction or leg length correction for Total Hip Arthroplasty. You select the area using the Outline tool, then select one of the following options from the popup menu:

- Cut — Removes the selected area.
- Displace — Creates an outline of the selected area.
- Copy — Duplicates the selected area.



You cannot create a cut or copy on images that have been related to each other (see “Performing Image Relation” on page 78).

Chapter 11: Using the Review and Ortho Tools

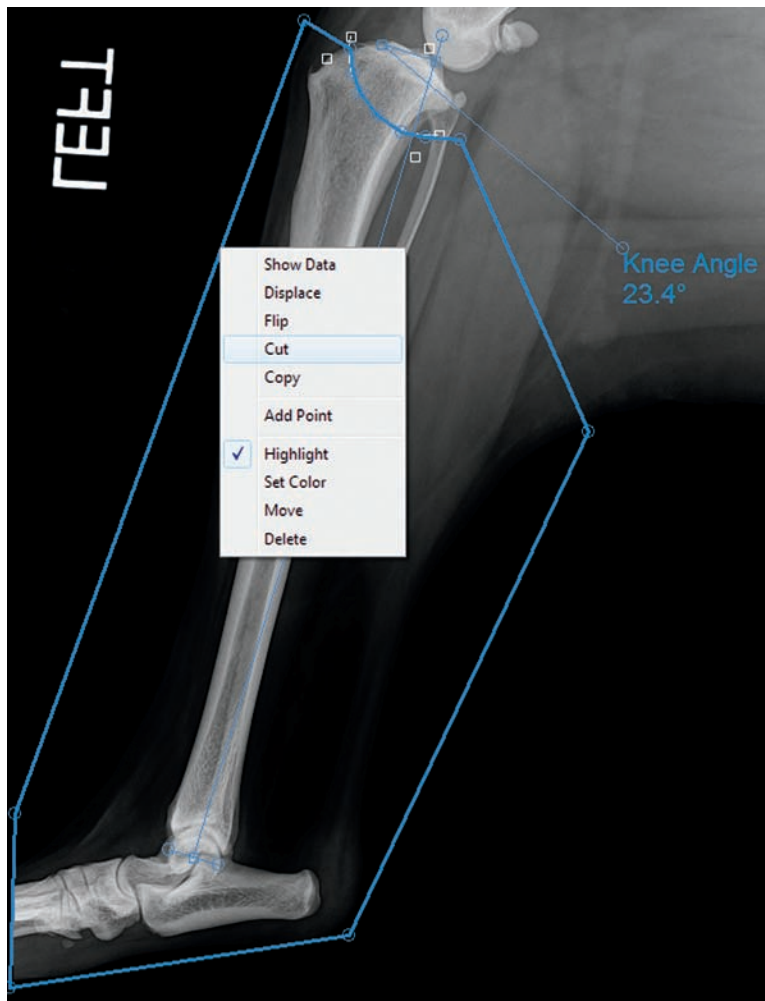
Using the Cut and Copy Feature (*continued*)

To create a cut or copy



You can only create one cut for each image in the study.

1. Draw an outline using the Outline tool (see “Drawing an Outline” on page 85).
2. Right-click along the outline and choose one of the following:
 - **Cut** – Removes the selected area of the image so it can be moved.
 - **Displace** – Creates an outline of the selected area without duplicating the image
 - **Copy** – Duplicates the selected area of the image.

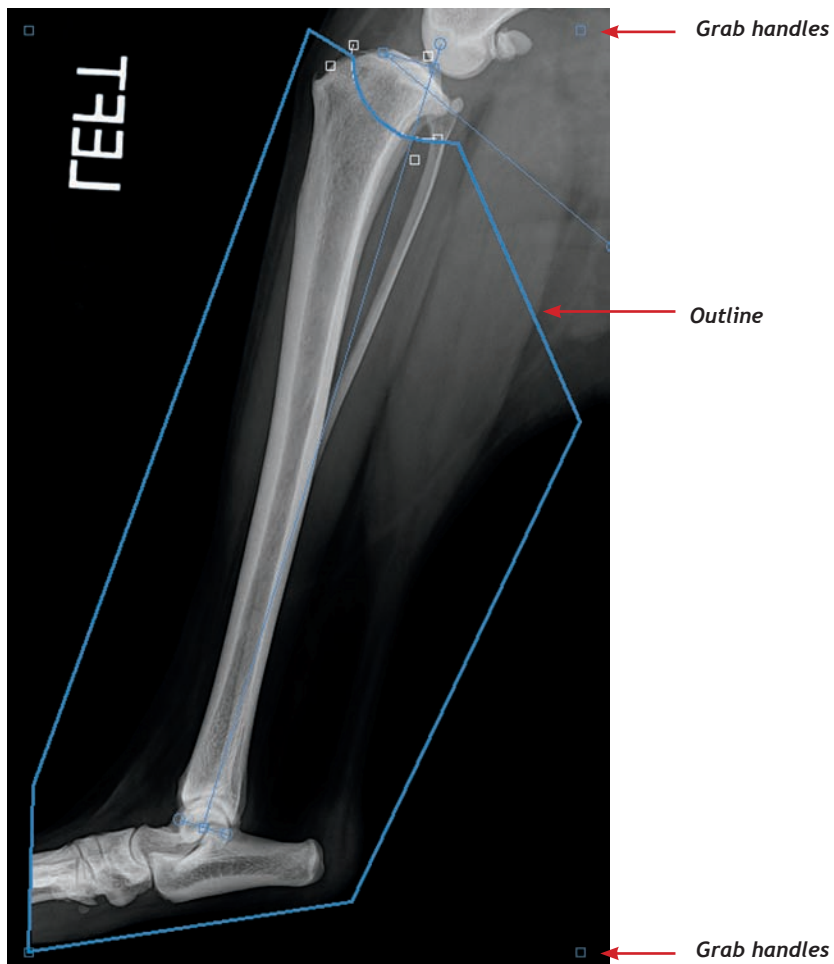


3. The cut or outline displays square grab handles in each of the four corners and the measurement of the selected area (i.e., circumference and area). At this point, you can pin the cut (not the outline) to a measurement (see “Locking an End-Point to a Cut or Copy” on page 95).

Chapter 11: Using the Review and Ortho Tools

Using the Cut and Copy Feature (*continued*)

4. You can do the following:
 - Click and drag the cut or outline to a new location.
 - Click and drag a grab handle to rotate the cut or outline.



Locking an End-Point to a Cut or Copy

You can lock an end-point of a measurement (e.g., distance, angle) to a cut or copy. You can then use the locked measurement to calculate the length or angle of the simulated correction. You can lock one, several or all endpoints to a cut.



You cannot lock a measurement to an outline created by the Displace option (see “Creating a Cut or Copy” on page 93).

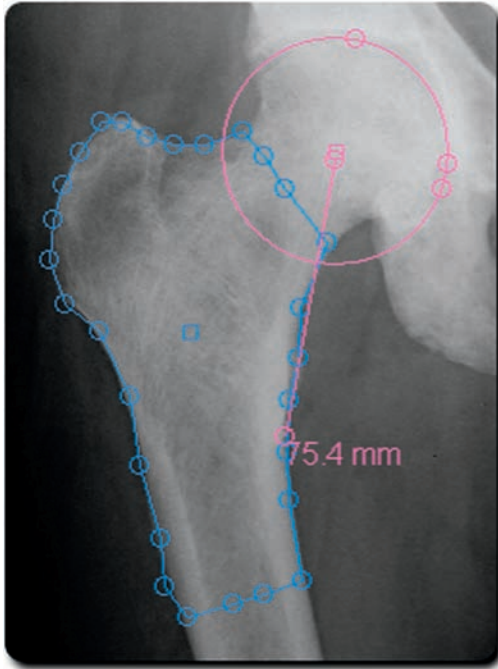
To lock an end-point to a cut or copy

1. Create a cut or copy (see “Using the Cut and Copy Feature” on page 93).

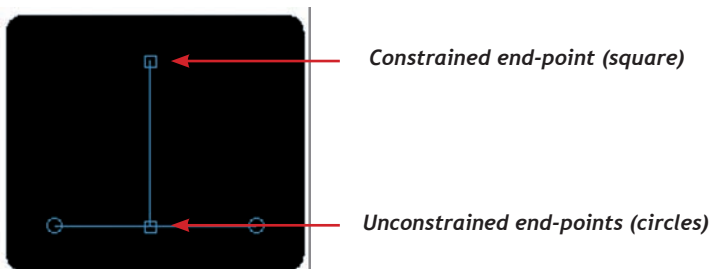
Chapter 11: Using the Review and Ortho Tools

Using the Cut and Copy Feature (*continued*)

2. Draw your measurements on the image. The example below shows measurements created using the Circle and Distance tools. It shows the distance between the middle of the femoral head and the lesser trochanter.



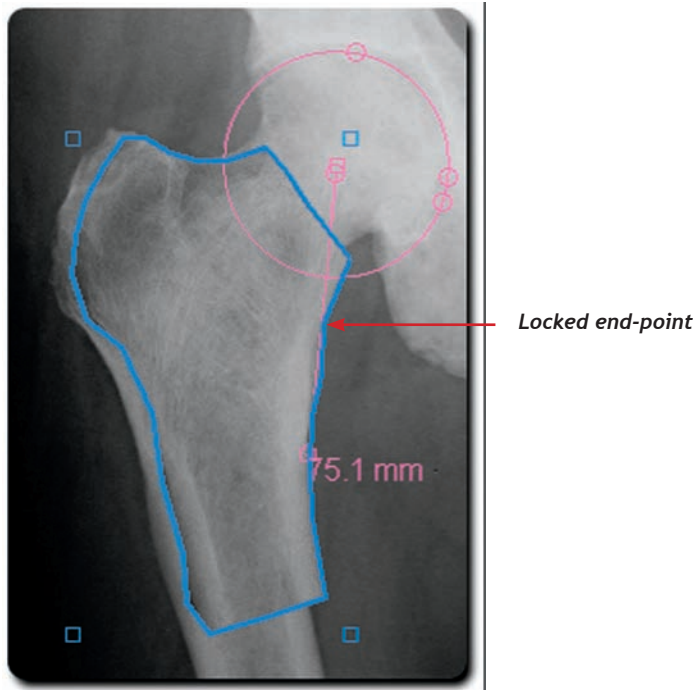
3. Right-click an end-point of a measurement and click Lock Point to lock it to the cut. A locked end-point changes to a padlock. You can only lock unconstrained end-points to a cut (i.e., end-points indicated by a circle).



Chapter 11: Using the Review and Ortho Tools

Using the Cut and Copy Feature (*continued*)

4. The example below shows a line measurement locked to the cut. As you move the cut-out (e.g., to correct the leg length), the measurement updates the distance between the femoral head and the lesser trochanter.



Creating a Text Table

You can create a table to hold and display all measurements created using the orthopaedic measurement tools. You can then copy the text table and paste it into a Windows application.

To create a text table

1. Do one of the following:
 - From the Measurements menu, click **Text**.
 - In the Ortho toolbar, click the **Text** button.



2. Click the image where you want to place the text table.
3. In the Set Table Title dialog box, type a name for your table and click **OK**. You can change the title at a later time using the popup menu (See Table 11.1 on page 101).

Chapter 11: Using the Review and Ortho Tools

Creating a Text Table (*continued*)

4. You can add a prefix (i.e., text) to the measurement by doing the following:
 - Right-click the measurement and click **Set Text Prefix** from the popup menu.
 - In the Input dialog box, type the desired text, then click **OK**.
5. Right-click the measurement text you want to place in the text table, drag it over the table's title, and release the mouse button.
6. In the popup menu, choose one of the following:
 - **Copy Text to Table** – Copies the measurement text into the text table. The measurement text appears beside the measurement and in the text table.
 - **Move Text to Table** – Moves the measurement text into the text table. The measurement text only appears in the text table.
7. The application displays the text below the table's title.
8. Repeat Steps 5 through 6 for any other text you want to place in the table.
9. When you are done, right-click the text table and click Copy to Clipboard. You can then paste your text table into a Windows application.



If you change a measurement after you place it in the table, the application automatically updates the measurement displayed in the table.

Editing an Ortho Measurement

You can edit an ortho measurement in several ways. You can change the position or the shape of an ortho measurement. You can also right-click an ortho measurement and use the options in the popup menu to edit or view data related to the measurement. The options in the menu depend on the item you click. Some menu options are common to all of the tools; a few menu options are specific to only one tool.

You can also select multiple measurements and templates and apply your edits to the group.

To select multiple measurements and/or templates

1. Hold down the SHIFT key and select the desired measurements and/or templates.
2. Move, rotate or delete them as a group.

To change the position of an ortho measurement

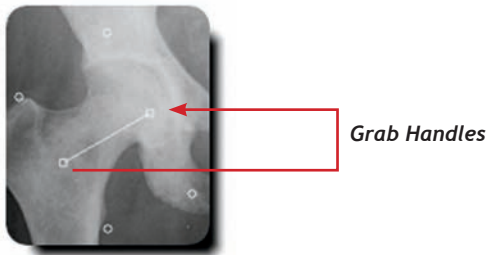
1. Click the measurement and drag it to a new position.
2. The application repositions the measurement on the image.

Chapter 11: Using the Review and Ortho Tools

Editing an Ortho Measurement (*continued*)

To change the shape of an ortho measurement

1. Do one or both of the following:
 - Click one of the points on the measurement and drag it to a new location.
 - If the measurement has grab handles (as shown below), click one of the grab handles and drag it to a new location. Note that the movement of a grab handle is restricted by the constraint on the grab handle. For example, in the diagram below, you can move the grab handle along the midline only.



2. The application repositions the point and redraws the shape.

To delete ortho measurements

1. Do one of the following:
 - Right-click the desired overlay or measurement and click Delete.
 - Click the Delete Measurement button in the Ortho toolbar and select the measurement that you want to delete.



- Select the measurement that you want to delete and press **DELETE**.
- To start over and delete all the measurements, click the **Delete All** button in the Ortho toolbar.



The Delete All function deletes all ortho measurements in the active viewport.

2. The application deletes the measurement.

Chapter 11: Using the Review and Ortho Tools *(continued)*

Using the Ortho Popup Menu

Each Ortho tool has a popup menu with different options. This section describes the options available for each popup menu.



To access the Ortho popup menu immediately after performing an ortho measurement, you must first click the Select button, then right-click the desired ortho measurement.



To use the Ortho popup menu



1. Right-click anywhere along the line of the ortho measurement.



2. The application displays a popup menu. The options in the menu depend on the item you clicked. A sample popup menu is shown below.
3. Use the option as described in Table 11.1 on page 101.

Chapter 11: Using the Review and Ortho Tools

Ortho Popup Menu Options (*continued*)

Table 11.1 – Ortho Popup Menu Options

Menu Option	Ortho Measurement	To Access	Function
Add Point	Outline	Right-click anywhere along the outline.	Allows you to add a point to the outline.
Copy Text to Table	Distance Angle Cobb's Angle Midline Perpendicular Line Parallel	Right-click the measurement text and drag to a text table, then release the mouse button	Copies the measurement text from the measurement into a text table.
Copy to Clipboard	Text Table	Right-click the text table	Allows you to copy the text table and paste it into a Windows application.
Delete	All	Right-click anywhere along the measurement (i.e., line, line, point, grab handle, or text).	Deletes the measurement (including the text).
Displace	Outline	Right-click the outline and click Displace. Then, click and drag a grab handle.	Displays grab handles so you can rotate the outline.
Flip	Outline	Right-click the outline and click Flip.	Enables you to flip the outline along the vertical axis.
Highlight	All	Right-click the measurement.	When the Highlight function is checked, parts of the measurement are highlighted (e.g., lines, points and grab handles). <i>Note: You can highlight only one measurement at a time.</i>
Join Points	All	Right-click a set of points that are overlapping or very close.	Joins two or more points so that they become a single point.
Move	All	Right-click anywhere along the measurement as follows: Line – moves the entire measurement. Grab handle – Only moves the grab handle. Text – Only moves the text.	Allows you to reposition the item.
Move Angle Here	Cobb's Angle	Right-click a point.	Moves the Cobb Angle measurement to the point that you click.

Chapter 11: Using the Review and Ortho Tools

Table 11.1 — Ortho Popup Menu Options (*continued*)

Menu Option	Ortho Measurement	To Access	Function
Move Text to Table	Distance Angle Cobb's Angle Circle Outline Midline Perpendicular Line Parallel	Right-click the measurement text and drag to a text table, then release the mouse button.	Moves the measurement text from the measurement into a text table. <i>Note: The text is moved from the measurement into the text table; it is not copied.</i>
Normal Angle	Angle Compare Angles	Right-click anywhere along the angle (i.e., line, point, measurement text).	When checked, displays the normal, or inside, angle.
Reflex Angle	Angle Compare Angles	Right-click anywhere along the angle (i.e., line, point, measurement text).	When checked, displays the reflex angle
Reset	Outline	Right-click a grab handle of the outline.	Resets the outline to its original orientation and position, and unmirrors the outline.
Remove Point	Outline	Right-click a point on the outline.	Allows you to remove a point from the outline. The application redraws the outline
Set Angle	Angle Cobb's Angle	Right-click anywhere along a line.	Allows you to specify an angle.
Set Label	All	Right-click along a grab handle.	Allows you to label the point.
Set Color	All	Right-click anywhere along the measurement (i.e., line, point, grab handle, or text).	Allows you to change the color of the measurement (i.e., the shape, grab handles and text).
Set Table Title	Circle Outline Text Table	Right-click the text.	Allows you to customize the title of the Text Table or Show Measurement Data.

Chapter 11: Using the Review and Ortho Tools

Table 11.1: Ortho Popup Menu Options (*continued*)

Menu Option	Ortho Measurement	To Access	Function
Set Text Prefix	Distance Angle Cobb's Angle Circle Midline Parallel Perpendicular Line Compare Distance Compare Angles	Right-click the measurement text. For Compare Distance and Compare Angles, right-click the comparison formula.	Allows you to insert text in front of the text that is generated automatically by the application. For Compare Distance and Compare Angles, allows you to customize the text in the comparison formula.
Show Data	Circle Outline	Right-click anywhere along the circle or outline (i.e., line, point or measurement text).	When checked, shows the measurement parameters (e.g., if you right-click a circle, the application displays the circle's radius, circumference, and area).
Show Distance	Distance Midline Perpendicular Line Parallel Compare Distance	Right-click anywhere along a line.	For Distance, displays the distance measurement of a line. For Midline, displays the distance measurement of the midline. For Parallel, displays the distance between two parallel lines. For Perpendicular Line, displays the distance measurement of the perpendicular line. For Compare Distance, displays the difference between two lines.
Snap to Line	Perpendicular Line	Right-click anywhere along a line or text of the Perpendicular Line measurement.	When checked, prevents the perpendicular lines from extending past the straight line.

Chapter 11: Using the Review and Ortho Tools

Table 11.1: Ortho Popup Menu Options (*continued*)

Menu Option	Ortho Measurement	To Access	Function
Snap to Middle	Mid Point	Right-click a point in the Mid Point measurement.	When checked, locks the mid point at the center of the line. If you clear the checkmark, you can move the mid point along the line.
Split Points	All	Right-click joined points.	Splits two or more joined points into separate points.
Supplementary Angle	Angle	Right-click anywhere along the measurement (i.e., a line, a point, a grab handle, or the measurement text).	When checked, displays the supplementary angle.

Chapter 11: Using the Review and Ortho Tools *(continued)*

Saving, Loading and Resetting Image Display Parameters

This section describes how to save, load and reset the image display parameter settings. The image display parameters are as follows:

- brightness/contrast
- zoom
- pan
- image orientation
- vertical flip
- grayscale inversion
- orthopaedic measurements

The application saves the image display parameters in the Plan History in Grayscale Softcopy Presentation State (GSPS) format.

When you next load the study from the Study Selection window, the Main Review window displays the last saved image parameters. You can update your changes (e.g., delete measurements, add new measurements and so on) and save it as a new entry in the Plan History.

Saving Image Display Parameters

You can save the image display parameters you have set during the current session. Each time you save your image display parameters, the application stores the settings in a Plan History from which you can load different saved settings at a later time (see “Loading Saved Image Display Parameters” on page 106).

To save the image display parameters

1. Do one of the following:
 - From the File menu, click **Save Plan** or press **CTRL+S**.
 - In the Review toolbar, click the **Save Plan** button.



2. In the Save Plan dialog box, type a meaningful description for the current setting and click **OK**.

Chapter 11: Using the Review and Ortho Tools

Saving, Loading and Resetting Image Display Parameters (*continued*)

To reset image display parameters

1. Do one of the following:
 - From the Tools menu, click **Reset**.
 - In the Review toolbar, click the **Reset** button.



2. The application resets the display parameter settings to the original image setting.

Undoing/Redoing Measurements and Annotations

The Undo tool enables you to undo the last measurement or annotation that you performed. The Redo tool allows you to redo the last action that you have undone.



The Undo and Redo tool cannot be used to undo/redo image display parameter changes (e.g., zoom, pan, brightness/contrast).

To undo the last action performed

1. Do one of the following:
 - From the Measurements menu, select **Undo**.



- In the Ortho Toolbar, click the **Undo** button.
2. The application undoes the last operation performed.

To redo the last undo operation

1. Do one of the following:



- From the Measurements menu, select **Redo**.
 - In the Ortho Toolbar, click the **Redo** button.
2. The application reapplies the last undo operation.

Chapter 11: Using the Review and Ortho Tools *(continued)*

Stitching Images

This section describes how to start the Sound-Eklin® Orthoplan Elite® X-Stitch module to select and stitch images together. The Sound-Eklin® Orthoplan Elite® X-Stitch module saves stitched images to the current patient study in the Sound-Eklin® Orthoplan Elite® database.



The stitched image appears as a series within a study in the Study Selection window, and as a thumbnail in the Main Review window.

You cannot perform any measurements, calibrate nor view an image in true size if an image has non-square pixels.

When you start the Sound-Eklin® Orthoplan Elite® X-Stitch module, use the thumbnails in the Main Review window to select images for stitching. You can load previously stitched images. However, you cannot load Secondary Capture images for stitching (see “Creating Secondary Capture Images” on page 126).



The Sound-Eklin® Orthoplan Elite® X-Stitch module is an optional feature packaged with the Sound-Eklin® Orthoplan Elite® application. If you have this feature, you can access the module from the Measurement menu or the Ortho toolbar. For details, refer to the Sound-Eklin® Orthoplan Elite® X-Stitch Chapters.

To start the stitching module



You cannot load additional images after you start the Sound-Eklin® Orthoplan Elite® X-Stitch module. Make sure that you select all the images that you want to stitch together when you first start the module.

1. To start the Sound-Eklin® Orthoplan Elite® X-Stitch module, do one of the following:
 - From the Measurements menu, click **Image Stitching**.
 - In the Ortho toolbar, click the **Image Stitching** button.



Chapter 11: Using the Review and Ortho Tools

Stitching Images (*continued*)

2. If there are images in the Image selection for Stitching dialog box, click Clear Image to clear the slots.



3. From the Main Review window, click and drag the desired thumbnails into a slot in the Image Selection for Stitching dialog box. You can select up to five images for stitching. When the images load into the module, the module displays two images at a time for stitching starting with first two images from the left. Ensure your images appear in the correct order from left to right.
4. Click **OK** to start stitching the selected images using the Sound-Eklin® Orthoplan Elite® X-Stitch module. For details on using the Sound-Eklin® Orthoplan Elite® X-Stitch module, refer to the Sound-Eklin® Orthoplan Elite® X-Stitch User's Guide Chapters 16 through 21.

Chapter 12: Using Orthopaedic Templates and Custom Measurements

This chapter describes other orthopaedic features which you can use when planning a procedure, including:

- a library of standard prosthetic overlays (see “Loading an Implant Overlay” on page 110); and
- a library of custom measurements (see “Loading a Custom Measurement” on page 115).

The Sound-Eklin® Orthoplan Elite® application also provides the following features to improve workflow:

- Favorites — You can tag commonly-used overlays or custom measurements as a favorite for easy access (see “Creating Favorites” on page 117).



To facilitate orthopaedic measurements across multiple images, you can choose to relate the images (see “Performing Image Relation” on page 84) or stitch them together (see “Stitching Images” on page 116).

Loading an Implant Overlay

Implant overlays are two-dimensional templates representing prosthetic implants that are used in the planning of orthopaedic surgery. The application provides implant overlays that are packaged as libraries. Sound-Eklin® makes new libraries available periodically.

Each implant overlay library contains the latest overlays, as well as older ones. If you need to obtain the latest overlay library, please contact Customer Support (see “Customer Support” on page 167). Access to implant overlay templates of various manufacturers is based on the Ortho Templates license that is currently installed.



The application automatically scales all implant overlays to true image size based on the image calibration. Therefore, you do not need to perform any other type of scaling.

To ensure accurate results, the images must be calibrated correctly before you load implant overlays (see “Correcting Image Magnification” on page 64).



The Sound-Eklin® OrthoTemplates dialog box varies depending on your selections; therefore, the screen captures in this section’s procedure should be viewed only as samples.

Chapter 12: Using Orthopaedic Templates and Custom Measurements

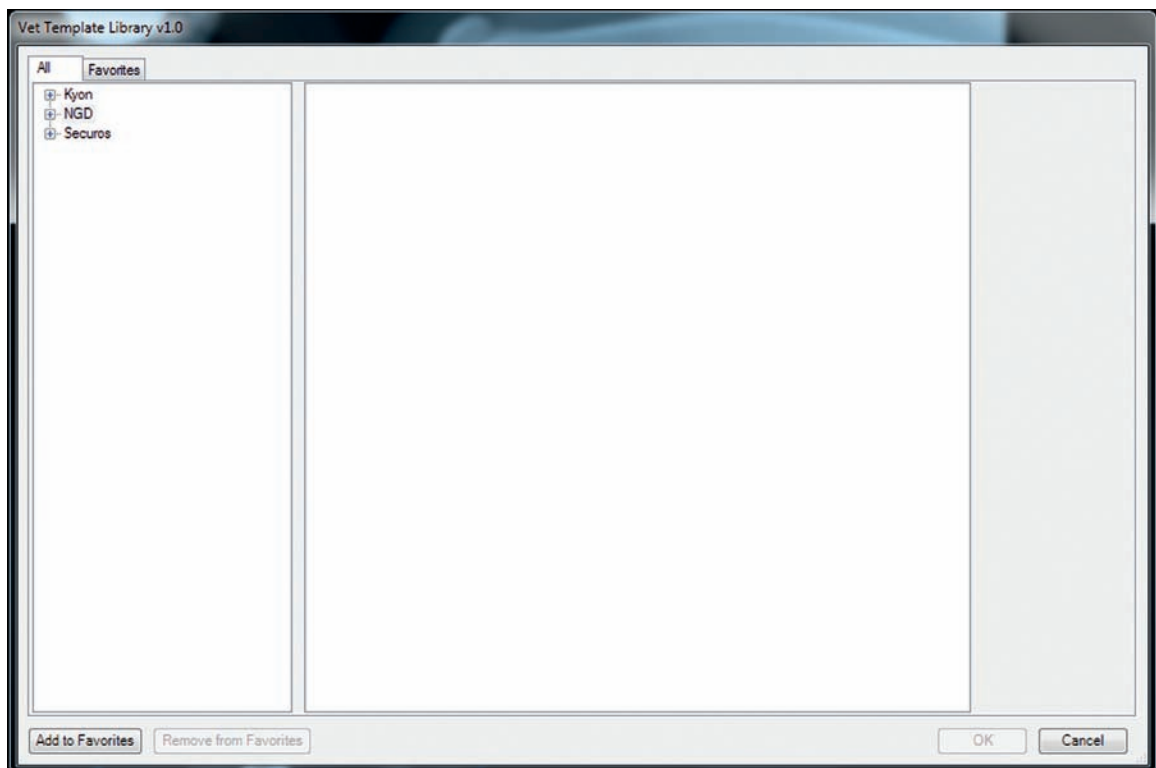
Loading and Implant Overlay (*continued*)

To load an implant overlay

1. Ensure that the Main Review window is using a viewport layout that shows the image on which you want to place an implant overlay (see “Changing the Image Layout” on page 81).
2. If you are using any layout other than 1x1, select the viewport with the image on which to perform automatic templating. The application loads the overlay on the image in the selected viewport.
3. Do one of the following:
 - From the Measurements menu, click **Templates**.
 - In the Ortho toolbar, click the **Templates** button.



4. In the Sound-Eklin® OrthoTemplates, you can do one of the following:
 - Click the All tab to see all the available implant overlays. The application groups the overlays by manufacturer.
 - Click the Favorites tab to see all tagged overlays. To tag the selected implant overlay as a favorite, see “Creating Favorites” on page 117.



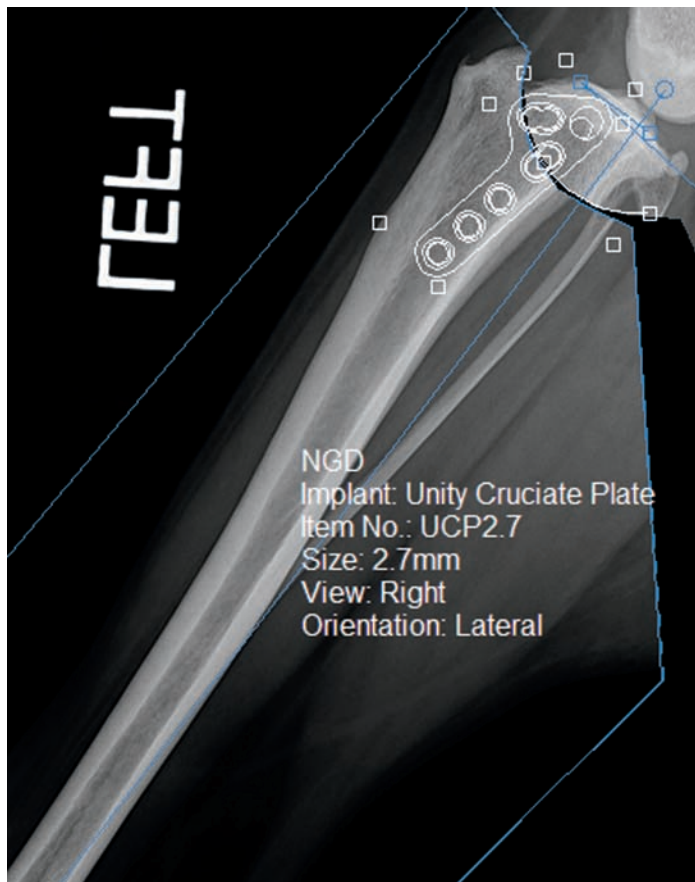
Chapter 12: Using Orthopaedic Templates and Custom Measurements

Loading and Implant Overlay (*continued*)

5. In the left window pane, click the expander buttons to navigate to the desired implant overlay.



6. In the right window pane, click the desired overlay to select it, and click **OK**.
7. The application returns you to the Main Review window with the selected implant overlay attached to your mouse pointer. Click the desired image to place the selected overlay in the correct viewport.
8. The application displays the overlay on the image in the active viewport. The application clearly labels the overlay. The example below shows the NGD 2.7 Unity Cruciate Plate.

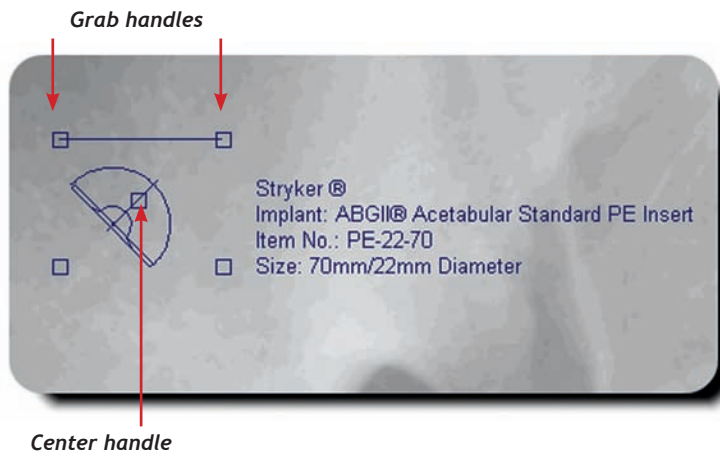


Chapter 12: Using Orthopaedic Templates and Custom Measurements

Loading and Implant Overlay (*continued*)

9. You can adjust the overlay as follows:

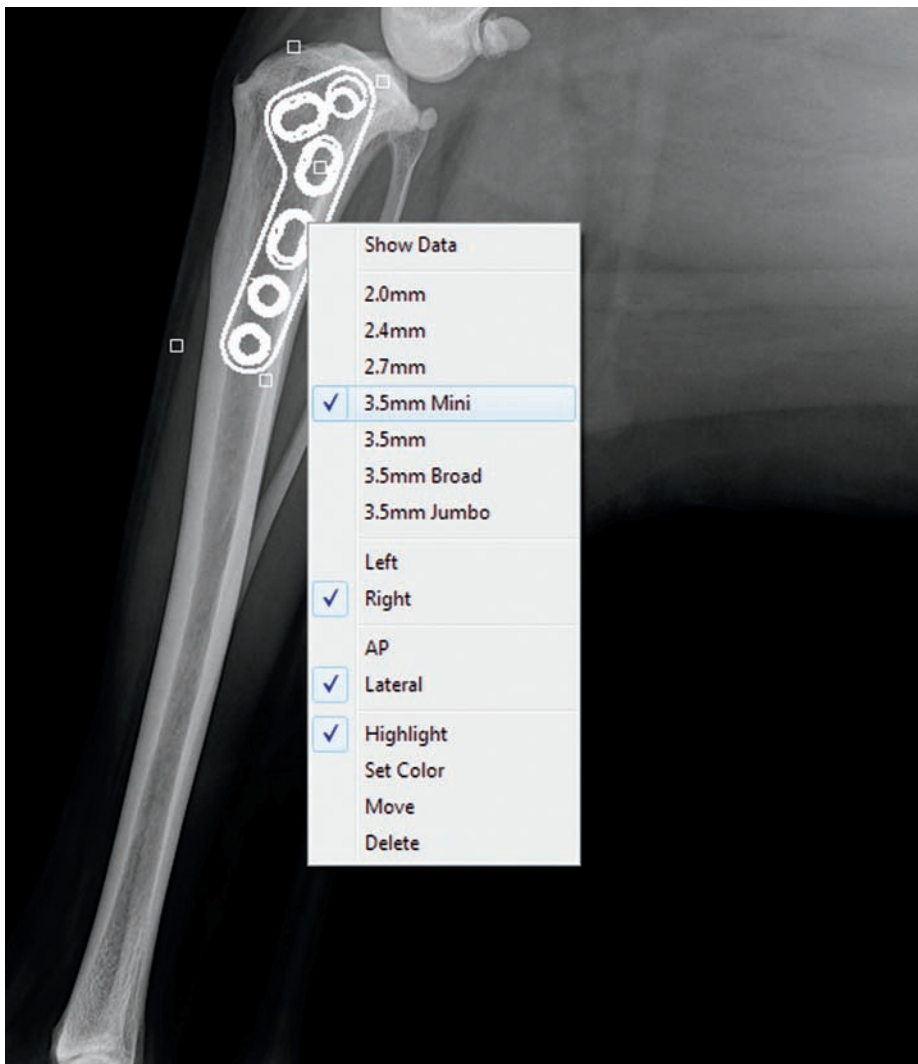
- **Move** – To move the overlay into the correct position over the image, click the boundary line of the overlay and drag the overlay to the new position.
- **Rotate** – To rotate the overlay, click one of the grab handles on the overlay and rotate the overlay to the desired angle.
- **Size** – To change the size of the overlay, click the boundary line of the overlay and rotate the mouse wheel.
- **Adjust center** – To adjust the center against which the overlay rotates. Click and drag the center handle to a new location, then click and drag the grab handles.



Chapter 12: Using Orthopaedic Templates and Custom Measurements

Loading and Implant Overlay (*continued*)

10. You can right-click the implant overlay and select an item from the Ortho popup menu. From the popup menu, you can:
- select a different overlay from the same implant family (e.g., different size or view); or
 - select an edit function (e.g., Show Data, Set Color). See Table 11.1 on page 101 for information on the Ortho popup menu.



11. To save the overlay, see “Saving Image Display Parameters” on page 105.



If you make further adjustments to the overlay, you must save your changes again.

Chapter 12: Using Orthopaedic Templates and Custom Measurements

Loading a Custom Measurement

Custom measurements are measurement macros that are used to create a commonly-used sequence of measurements. They mimic a planning methodology (i.e., customized to your site) to reduce the amount of mouse clicks and menu interactions to achieve a desired outcome. Their purpose is to increase efficiency and decrease learning curves.

Any number of custom measurements can be created for you. If you wish to add new custom measurements, please contact Customer Support (see “Customer Support” on page 167).



To ensure accurate results, the images must be calibrated correctly before you load custom measurements (see “Correcting Image Magnification” on page 64).

To assist you, the application displays instructions in the status bar to guide you through the steps. An example instruction line is shown below.



Chapter 12: Using Orthopaedic Templates and Custom Measurements

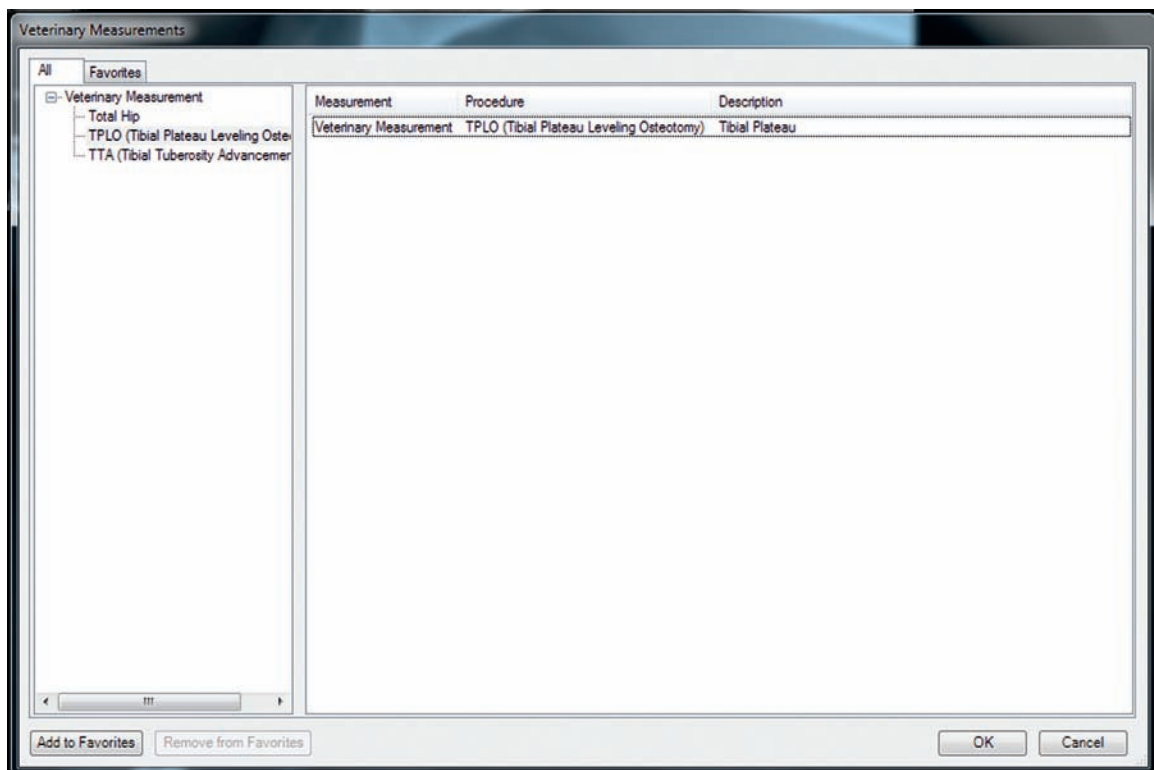
Loading a Custom Measurement (continued)

To perform a custom measurement

1. Do one of the following:
 - From the **Measurements** menu, click **Custom Measurement**.
 - In the Ortho toolbar, click the **Custom Measurement** button.



2. The application displays all the available custom measurements in the Custom Measurement dialog box. The application groups the custom measurements by surgical procedure and user. Do one of the following:
 - Click the All tab to see all available custom measurements.
 - Click the Favorites tab to see tagged measurements. To tag a custom measurement as a favorite, see “Creating Favorites” on page 117.



3. In the left window pane, click the expander buttons to navigate to the desired custom measurement.



Chapter 12: Using Orthopaedic Templates and Custom Measurements *(continued)*

4. In the right window pane, click the desired custom measurement to select it, then click **OK**.
5. The application returns you to the Main Review window. Follow the instructions in the status bar to perform the custom measurement. The status bar displays the next step to perform as you complete each stage.
6. When you have taken all the measurements, the active viewport displays the final results. To save the results, see “Saving Image Display Parameters” on page 105.

Deleting Applied Overlays and Custom Measurements

At any time, you can delete applied overlays and custom measurements.

To delete ortho measurements

1. Do one of the following:
 - Right-click the desired overlay or custom measurement and click Delete.
 - Click the Delete Measurement button in the Ortho toolbar and select the overlay or custom measurement that you want to delete.



- To start over and delete all the overlays and custom measurements, click the Delete All button in the Ortho toolbar.



The Delete All function deletes all ortho measurements in the active viewport.

2. The application deletes the selected overlay and measurement.

Creating Favorites

Instead of navigating through the hierarchy to search for a commonly used implant overlay or custom measurement, you can tag it as a favorite in both the Sound-Eklin® OrthoTemplates and Custom Measurement dialog boxes.

Tagged overlays and custom measurements are duplicated in the Favorites tab for easy access. You can use the items saved in the Favorites tab to:

- load an overlay custom measurement (see “Loading an Implant Overlay” on page 110); and
- load a custom measurement (see “Loading a Custom Measurement” on page 115).

Chapter 12: Using Orthopaedic Templates and Custom Measurements

Creating Favorites (*continued*)

Creating a Favorite

Use this procedure to tag an overlay or custom measurement as a favorite.



For implant overlays, you can also tag a manufacturer, a group of products or a single product family as a favorite.

The Sound-Eklin® OrthoTemplates and the Custom Measure dialog boxes display tagged overlays and custom measurements with an asterisk ().*

To create a favorite

1. Do one of the following:
 - In the Ortho toolbar, click the **Templates** button to tag an overlay as a favorite.



- In the Ortho toolbar, click the **Custom Measure** button to tag a custom measurement as a favorite.



2. Click the All tab to see all the available implant overlays or custom measurements.
3. In the left window pane, click the **expander** buttons to navigate to the desired implant overlay or custom measurement.
4. In the right window pane, click the desired overlay or custom measurement to select it, then click **Add to Favorites**.



5. The application adds the selected item to the Favorites tab. The Favorites tab lists favorites using the same structure as the items in the All tab.
6. Click **OK**.

Chapter 12: Using Orthopaedic Templates and Custom Measurements *(continued)*

Managing the Favorites

Use the following procedure to delete items from the Favorites tab. To edit your favorites

1. Do one of the following:
 - In the Ortho toolbar, click the **Templates** button to edit your list of favorite overlays.



- In the Ortho toolbar, click the **Custom Measure** button to edit your list of favorite measurements.



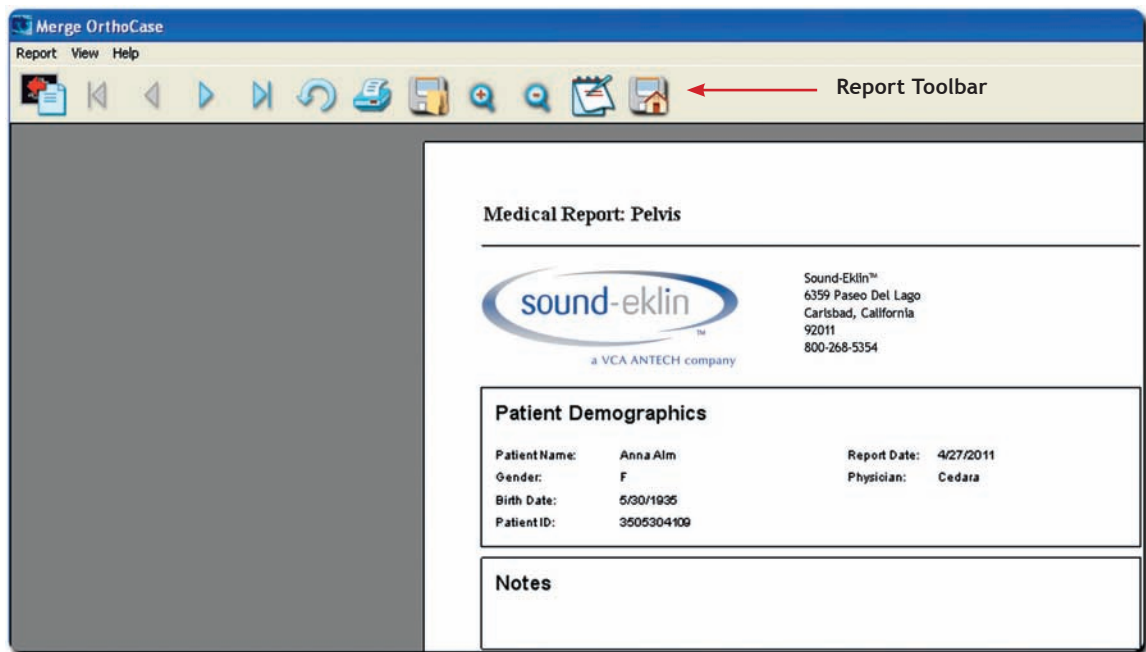
2. Click the **Favorites** tab.
3. In the left window pane, click an **expander** button to find the desired implant overlay or custom measurement.
4. In the right window pane, click the desired item to select it, then click **Remove from Favorites** to delete the item from the Favorites tab.



5. Click **OK**.

Chapter 13: Generating Reports

This chapter describes how to use the Report window to create a report for the current patient study. The Report window includes the Report toolbar. You can review your report and add additional comments.



Creating Reports

This section describes how to open and close the Report window. Open the Report window from the Main Review window. When you open the Report window, the application automatically creates a report for the patient study which includes images with measurements and overlays from your review session. If any images include an implant overlay, the report also provides a summary of the applied overlay.

While editing your report, you can return to the Main Review window to make further changes to the images in the patient study. You can move between the Main Review window and the Report window without losing any changes in either window. When you return to the Report window, the report updates the images according to any changes in the Main Review window (e.g., if you added a new overlay to an image).

Before you exit the patient study (i.e., return to the Study Selection window) and load a new patient study, you must save your report; otherwise, you will lose the edits in your report (e.g., updated site information, any additional notes).



If you do not save your report before you exit a patient study and load a new patient study, you will lose your report. To open the Report window

Chapter 13: Generating Reports

Creating Reports *(continued)*

1. Do one of the following:
 - From the View menu, click **Report Page**.
 - In the Review toolbar, click the **Report Page** button.



2. The application displays the Report window with default information for the current patient.

To return to the Main Review window



When you close the Report window, the application returns you to the Main Review window.



If you do not save your report before you exit a patient study and load a new patient study, you will lose your report.

- Do one of the following:
 - From the Report menu, click **Return to Review Page**.
 - In the Report toolbar, click the **Return to Review Page** button.



Customizing Your Reports

By default, the application displays the site information using the contact information and logo. You can change both the contact information and logo to customize the report for your site. To edit the site information for the report



The application remembers changes to site information. You do not have to change the information each time you generate a new report.

1. Open the Report window (see “Creating Reports” on page 120).
2. From the Report menu, click **Site Info**.

Chapter 13: Generating Reports

Customizing Reports (*continued*)

3. In the Edit Report Site Info dialog box, type the correct site information for the report.



4. To change the logo used in the report, do the following:
 - Click **Change Image**.
 - In the Open dialog box, navigate to the appropriate folder.
 - Click the new image file to select it and click **Open**.
5. Click **OK** to save your changes and return to the Report window.

Editing Reports

You can edit the properties of the report you are generating to reflect the correct information such as the name of the physician. You can also customize the title of the report and add any notes you want to include in the report.



Images that do not have measurements and overlays do not appear in the report.

While using the Report window, you can move between the Report window and the Main Review window without losing the changes in your report (see “Creating Reports” on page 120).

To edit a report

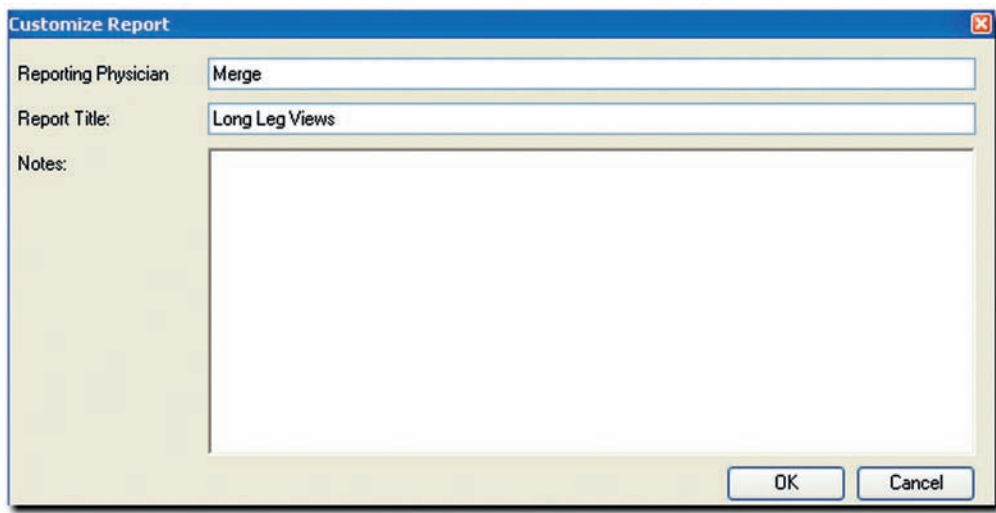
1. Open the Report window (see “Creating Reports” on page 120).
2. In the Report toolbar, click the **Customize Report** button.



Chapter 13: Generating Reports

Editing Reports (*continued*)

3. In the Customize Report dialog box, do the following:
 - In the Reporting Physician field, type the name of the physician.
 - In the Report Title field, type a title for your report (e.g., Knee Replacement Surgical Plan).
 - In the Notes field, type any notes you want to include in the report.



The screenshot shows a 'Customize Report' dialog box with a blue title bar. It contains three input fields: 'Reporting Physician' with the text 'Merge', 'Report Title:' with the text 'Long Leg Views', and a large empty 'Notes:' text area. At the bottom right are 'OK' and 'Cancel' buttons.

4. Click **OK**.
5. While in the Report window, you can:
 - review the different pages in the report (see “To navigate a report” on page 123);
 - zoom the report (see “To zoom in and out of a report” on page 123);
 - search for specific text (see “To search a report for specific text” on page 124); and
 - refresh the report to see your updated changes (see “To refresh a report” on page 124).
6. When you have finished editing your report, you can print the report and save it as a PDF (see “Saving and Printing Your Report” on page 124).

To navigate a report

- To scroll through the report, you can use the Go To First Page, Go to Previous Page, Go to Next Page or Go to Last Page buttons. These options are also available in the View menu.



Chapter 13: Generating Reports

Editing Reports (*continued*)

To zoom in and out of a report

1. To increase the image of the report in the preview pane, do one of the following:
 - From the View menu, click **Zoom In**.
 - In the Report toolbar, click the **Zoom In** button.



2. To decrease the image of the report in the preview pane, do one of the following:
 - From the View menu, click **Zoom Out**.
 - In the Report toolbar, click the **Zoom Out** button.



To search a report for specific text

1. To search a report for specific words, press **CTRL+F**.
2. In the Find Text dialog box, type the text for which to search and click Find Next.

To refresh a report

- To refresh your report, do one of the following:
 - From the View menu, click **Refresh Report**.
 - In the Report toolbar, click the **Refresh Report** button.



Saving and Printing Your Report

You can send your report to the system printer, and save a copy of your report as a PDF, Microsoft Word or Rich Text Format file. The application only saves the report as a file on your local hard drive. It does not save the report against the patient study in the Sound-Eklin® Orthoplan Elite® database.



If you want to save a copy of the report, you must save it before you exit the patient study (i.e., load a new patient study from the Study Selection window) or you will lose the edits in your report (i.e., information in the Customize group box and the Doctor's Notes field).

Chapter 13: Generating Reports

Saving and Printing Your Report (*continued*)

To print the report

1. Do one of the following:
 - From the Report menu, click **Print Report**.
 - In the Report toolbar, click the **Print Report** button.



2. In the Print dialog box, select a printer from the Name drop-down list and click **OK**.

To save a report

1. Do one of the following:
 - From the Report menu, click **Save Report**.
 - In the Report toolbar, click the **Save Report** button to save the report to the local server, or click the **Save to Archive** button to save the report to the server



2. In the Save In dropdown list, browse to the folder in which to save your report.
3. In the File Name field, type a file name for the report.
4. In the Save As Type dropdown list, select a format for the file (i.e., Adobe PDF or Excel for Windows).
5. Click **Save**.
6. When the application displays a confirmation message, click **OK**.

Chapter 14: Capturing and Printing Images

You can capture images for the following purposes:

- to create secondary capture images; thereby saving image manipulation and annotations (see “Creating Secondary Capture Images” on page 153);
- to paste images into other applications (see “Copying Images to Other Applications” on page 155); and
- to print or film the images (see “Printing Images” on page 156).

This chapter describes how to perform these functions.

Creating Secondary Capture Images

After you have reviewed a patient’s images, you can create a new series by capturing key images and defining a layout. You can then print the secondary capture images in the specified layout.

Before creating secondary capture images, you can zoom, pan, and perform other image manipulation to better view an area of interest, as well as annotate the images. The application saves the captured images along with the applied manipulations and annotations as a new series.



Do not select empty image viewports when creating secondary capture images.

By default, the application saves secondary capture images in a new study. To change this setting, see “Configuring the Secondary Capture Settings” on page 133.

To create secondary capture images

1. Do one of the following:
 - From the File menu, click **Save Images**.
 - In the Ortho toolbar, click the **Save Images** button.



Chapter 14: Capturing and Printing Images

Creating Secondary Capture Images (*continued*)

- When the application displays the Save dialog box, click **Save**.



- Do one of the following:
 - If your application is configured to save secondary capture images in a new study, click **OK**. You can load the new study from the Study Selection window.

	Patient Name	Modality	Date Time	Patient ID	G...	Date of Birth	# S...	Procedure	Body Part
	Mejor, Mary	CT	5/5/2009 1:44:01 PM	00-2345	F	3/10/1950	1/1	Consult	EXTREMITY
	Mejor, Mary	CT	4/11/2006 11:23:59 A...	00-2345	F	3/10/1950	1/87		EXTREMITY
	Miles, Richard	OT	9/20/2003 1:32:38 PM	00-4567	M		1/1	Consult	
	Stiles, Jane	CT	3/25/2004 1:31:08 PM	00-3456	F	11/7/1977	1/1...		BODY
	Stiles, John	CT	2/1/2005 4:01:15 PM	00-1234	M		1/99		

← Newly created study

- If your application is configured to save secondary capture images as a new series, you can load the new series from the Study Selection window (see “Selecting and Loading Series within a Study” on page 36).

Newly Created Secondary Capture Series →

Series List						
	Description	M...	Series Number	# Images	Date Time	View Posit
☒		CR	3	1	143400	
☒		CR	4	1	143700	
☒		CR	5	1	143800	
☒		CR	6	1	143800	
☒	Secondary Capture	CR	1	1	143400	
☒	Plan #1	PR		6	20070423 140612	

Data Source LOCAL (9% full) Displayed: 19 Selected: 1

Chapter 14: Capturing and Printing Images *(continued)*

Copying Images to Other Applications

This function is extremely useful for creating teaching files, papers and presentations. It allows you to easily copy a displayed image to the clipboard so that you can paste it into other graphics or word processing applications, such as Microsoft Word or PowerPoint. Depending on the application that you select, you may have the choice to save the image as TIF, GIF, BMP or JPEG.



You must paste the copied image into another application to save it.

To copy an image

1. Click the viewport of the image you want to copy.
2. Press **CTRL+C**.
3. Go to the graphics or word processing application and open a file.
4. Paste the image in the new file. In many applications, you can press **CTRL+V** to paste the image.
5. Save the image file to the appropriate directory or disk.

Printing Images

You can print to postscript, GDI and DICOM printers on the network that were configured during installation. You can also print the images to a file (i.e., .BMP, .JPG). For information regarding your workstation's printer configuration, contact your System Administrator.



This application supports true-size printing. To print selected images

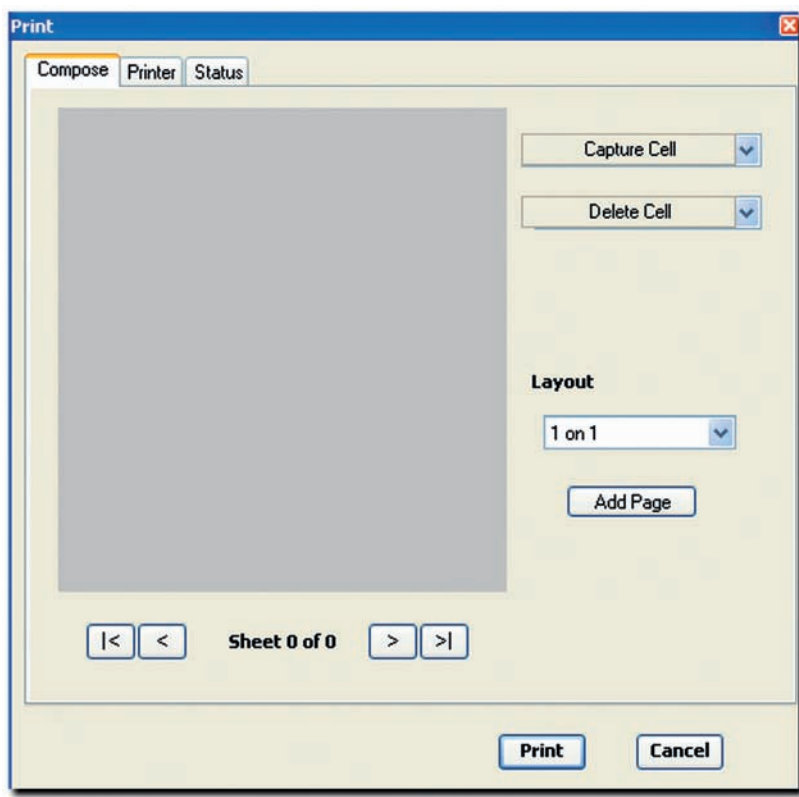
1. When the images are displayed in their preferred format, do one of the following:
 - From the File menu, click **Print Images** or press **CTRL+P**.
 - In the Review toolbar, click the **Print Images** button.



Chapter 14: Capturing and Printing Images

Printing Images (*continued*)

2. The application displays the Print dialog box.



3. Specify a print layout (e.g., 4 on 1) for the images that you want to print and click **Add Page**.
4. To place images in the frames, do the following:
 - In the Main Review window, click the viewport or the thumbnail that you want to capture.
 - Click **Capture Cell** to place the active image into the active frame.



5. The application displays the images in the frames. Although orientation markers, annotations, etc., do not appear on the images in the frames, they will appear on the images when they are printed.
6. You can use the Next arrow, Previous arrow, Beginning arrow or End arrow to scroll through the sheets of images.



Chapter 14: Capturing and Printing Images *(continued)*

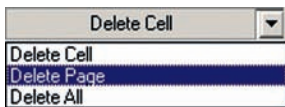
Printing Images *(continued)*

7. To remove images, do the one of the following:

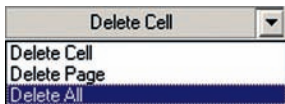
- If you want to remove an image from the dialog box, click the image to activate it, then click **Delete Cell**.



- If you want to remove a page, in the Delete dropdown menu, select Delete Page and click **Delete Page**.



- If you want to remove all the images from the dialog box, in the Delete dropdown menu, select **Delete All** and click **Delete All**.



8. Set your printer destination (see “Setting the Printer Destination” on page 131).

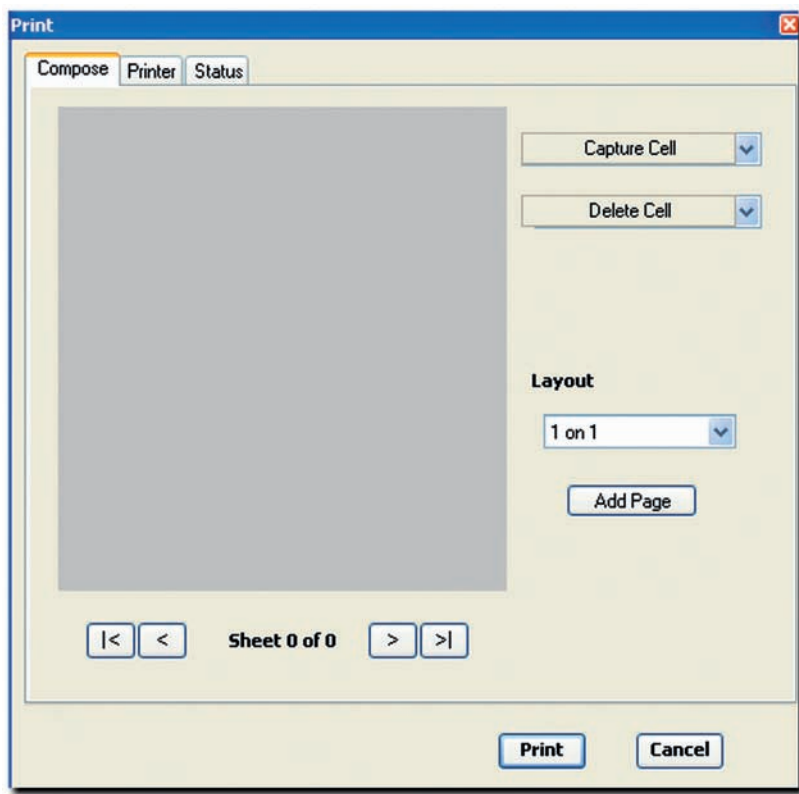
9. Click **Print**.

Chapter 14: Capturing and Printing Images

Printing Images (*continued*)

Setting the Printer Destination

You can print to postscript, GDI and DICOM printers on the network that were configured during installation. You can also print the images to a file (i.e., .BMP, .JPG).



To set the printer destination

1. In the Print dialog box, click the **Printer** tab.
2. In the Printer dropdown list, select the printer. You can choose from all the printers that are accessible from your workstation.
3. If required, in the Source dropdown list, select the source.
4. If required, in the Film Size dropdown list, select the film size.
5. Select the “True Size” checkbox to print the selected images in the actual acquired size and resolution.
6. In the Quality dropdown list, select the print quality (i.e., low, normal, or high).
7. In the Copies field, type the number of copies to print.

Chapter 14: Capturing and Printing Images

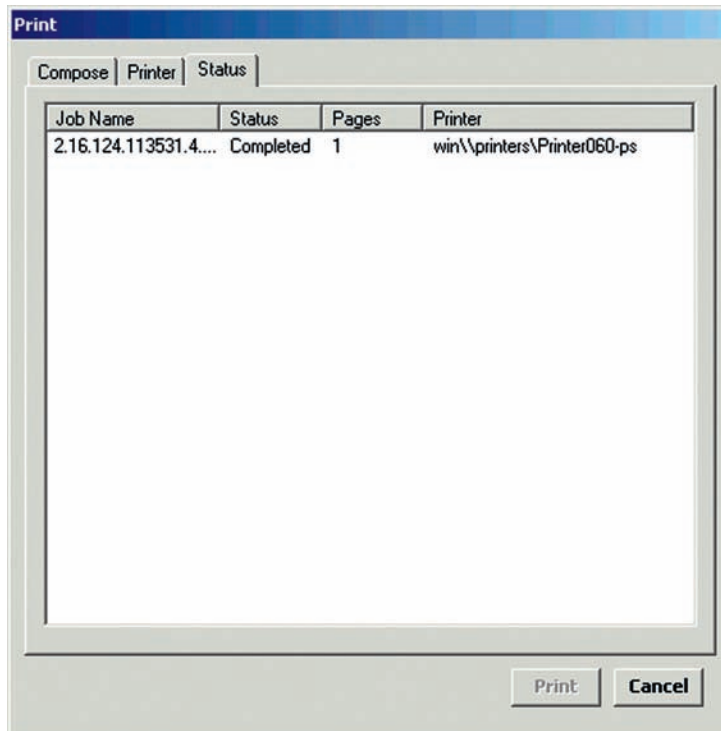
Printing Images (*continued*)

Monitoring the Print Job Status

After you send the images to print, you can check the status of the print job.

To check the status of the print job

1. In the Print dialog box, click the **Status** tab.
2. The application displays each print job and its respective status.



3. To close the dialog box, click **Cancel**.

Chapter 15: Configuring the Application

You can configure the application to best suit your own viewing needs. This can be done using the Options menu (e.g., secondary capture settings).

Understanding User Preferences

The following list contains preferences that you can set while using the application. The application saves these settings with your user name when you exit the application.

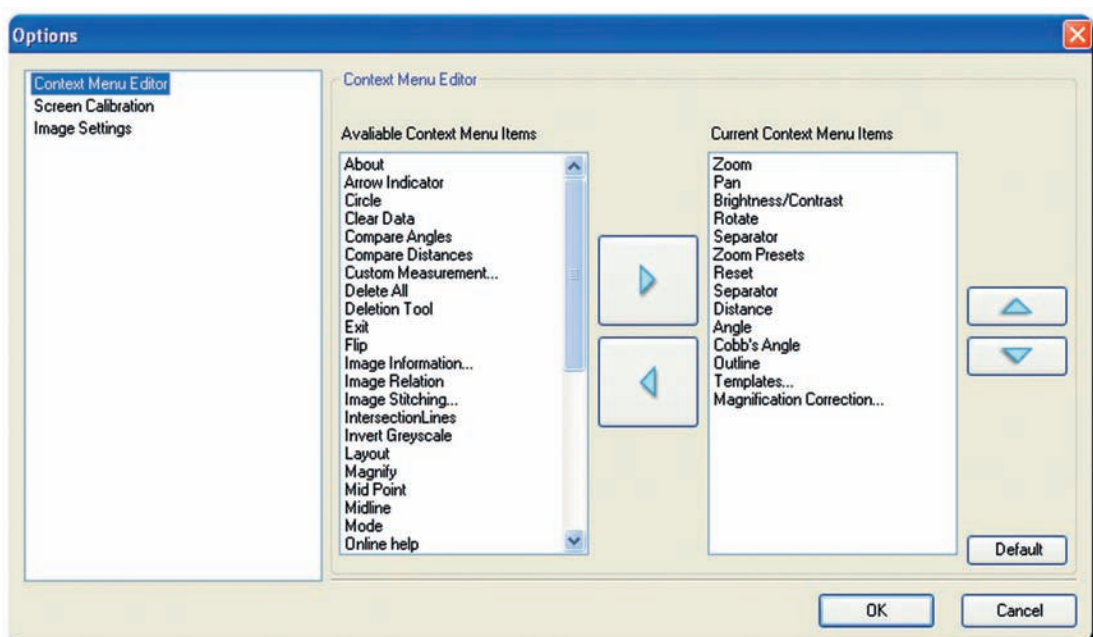
- popup menu (see “Customizing the Popup Menu” on page 58)
- secondary capture settings (see “Configuring the Secondary Capture Settings” on page 133)
- copy/paste settings (see “Configuring the Copy/Paste Settings” on page 134)
- monitor screen size (see “Calibrating Your Monitor” on page 135)

Configuring the Secondary Capture Settings

You can specify the application to automatically save secondary capture images as a new image within the same study, or as images in a new study. By default, the application saves secondary capture images in a new study.

To configure secondary capture settings

1. From the Tools menu of the Main Review window, click **Options**.
2. In the Options dialog box, click **Image Settings**.



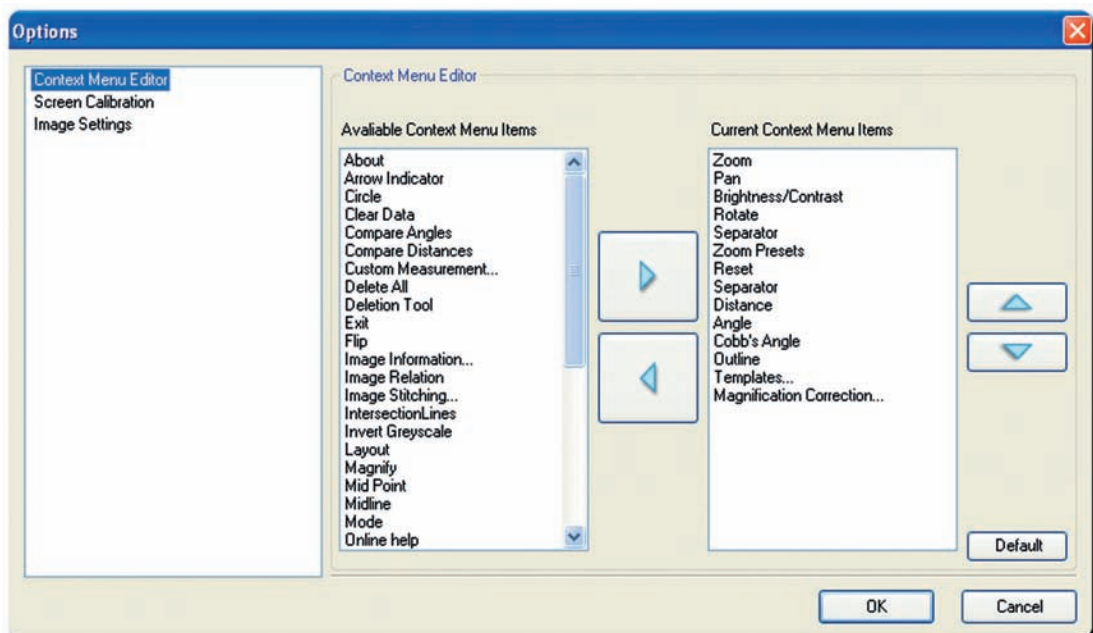
3. By default, the application saves secondary capture images in a new study. To save secondary capture images as a new image within the same study, clear the “Create Secondary Capture image in a new Study” checkbox.
4. Click **OK**.

Chapter 15: Configuring the Application *(continued)*

Configuring the Copy/Paste Settings

To configure copy/paste settings

1. From the Tools menu of the Main Review window, click **Options**.
2. In the Options dialog box, click **Image Settings**.



3. From the Image Size dropdown list, select the size of the image (i.e., the size of the copied image when you paste it).
4. Click **OK**.

Chapter 15: Configuring the Application *(continued)*

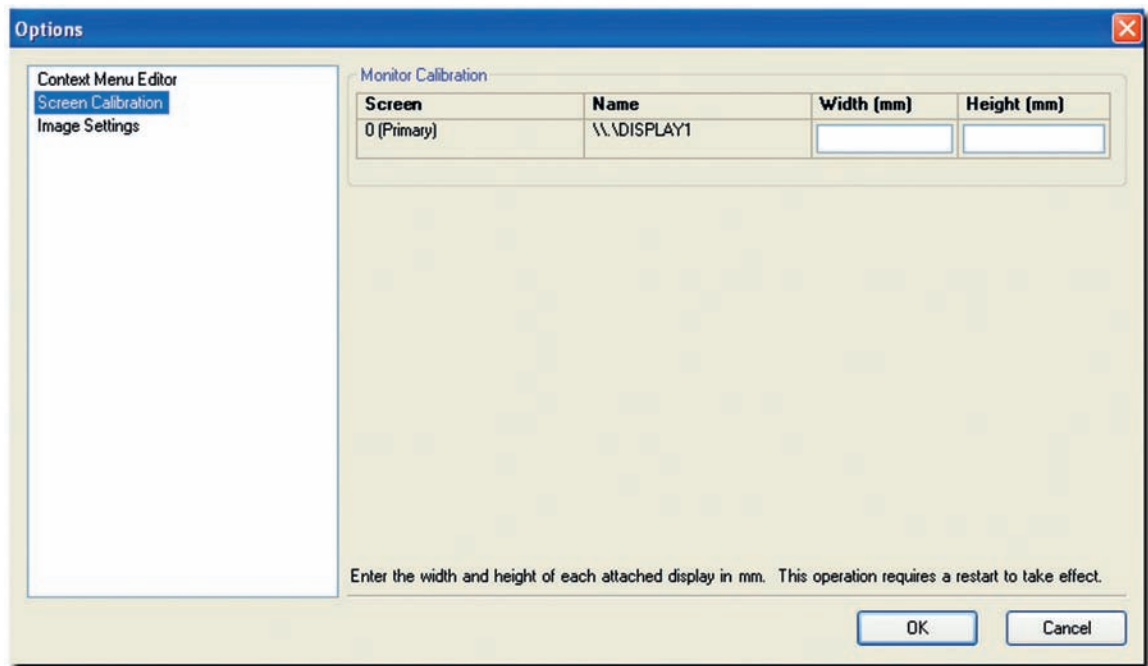
Calibrating Your Monitor

The application enables you to specify the screen size of your monitor.



You must be logged on as Administrator to be able to calibrate the monitor. To calibrate your monitor

1. From the Tools menu of the Main Review window, click **Options**.
2. In the Options dialog box, click **Screen Calibration**.



3. In the Width and Height fields, type the width and height (in millimeters) of your monitor. If you have more than one monitor attached to your workstation, the Options dialog box displays a line for each monitor. Make sure you specify the width and height for all monitors attached to your workstation.
4. Click **OK**.

Chapter 16:

Orthoplan Elite® X-Stitch Overview

This user's guide is designed to introduce you to the main Sound-Eklin® Orthoplan Elite® X-Stitch module functions. Each chapter provides easy, step-by-step instructions to help you use the module. Wherever possible, the illustrations reflect the module's standard configurations.

About the Module

The Sound-Eklin® Orthoplan Elite® X-Stitch module allows you to merge two or more DICOM digital radiographic images together. It offers various stitching and blending methods to provide flexibility in stitching images obtained from almost any part of the body. Once the images have been joined together, the result can be stored as a DICOM file for further analysis.



The Sound-Eklin® Orthoplan Elite® X-Stitch module provides the option to manually stitch images. When stitching images manually, the application relies on the end user to specify individual fiducial markers on each image that is being used to create the final stitched image. If these points are not properly placed, the resulting stitched image may not be indicative of the inherent native data. Therefore, it is possible to create images that show structures or malformations, which are not truly present in the original image data set.

About this Guide

This user's guide assumes that you are familiar with the basic operation of personal computers, such as how to turn them on, how to use the mouse, and how to work in the Microsoft Windows Operating System environment. If you are not familiar with these operations, please refer to the documentation provided with your workstation.

Chapter 17:

Getting Started Orthoplan Elite® X-Stitch

This chapter briefly describes how to start the module, use the online help system and exit the module.

Starting the Module

Open the Sound-Eklin® Orthoplan Elite® X-Stitch module from the Sound-Eklin® ProPlanner™ application.

When you save your stitched image, the module saves the image to the patient study in the Sound-Eklin® ProPlanner database. When you exit the Sound-Eklin® Orthoplan Elite® X-Stitch module, the saved stitched image appears as a thumbnail in the Main Review window of the Sound-Eklin® ProPlanner application.

Using the Help System

The help system provides quick access to user instructions.

To use the online help

1. From the **Help** menu, select **Help Topics**.
2. The module displays the help system in a separate window.
3. Use the following features to navigate the help system and find the required topics:
 - Click **Contents** to display a list of topics available, then click the topic you want to view.
 - Click **Index** to display a list of keywords from which you can select a topic. Type in the first few letters of the keyword you are looking for, then double-click the keyword. This is often the easiest way to find a topic.
 - Click **Search** to find all topics that contain a keyword. Type the keyword you want to find, click **List Topics**, then click the desired topic in the list displayed.
 - Click **Back** to return to the last topic viewed.

Using the Quick Start Tips

The Quick Start Tips displays a list of tips for getting started with the module.

To use the Quick Start tips

1. From the **Help** menu, click **Quick Start Tips**.
2. The module displays a dialog box with a list of tips.

Chapter 17: Getting Started Orthoplan Elite® X-Stitch *(continued)*

Using the About Box

The About box displays the plug-in's program version.

To access version information

1. From the **Help** menu, select **About Orthoplan Elite® X-Stitch**.
2. The module displays the version number.
3. Click **OK** to close the dialog box.

Exiting the Application

This section describes how to exit the application.

To exit the application

1. From the **File** menu, select **Exit** or press ALT+F4.
2. If there are unsaved changes in the current session, click **Yes** to save those changes.

Chapter 18: Configuring the Orthoplan Elite® X-Stitch Module

You can configure the module using the File menu.

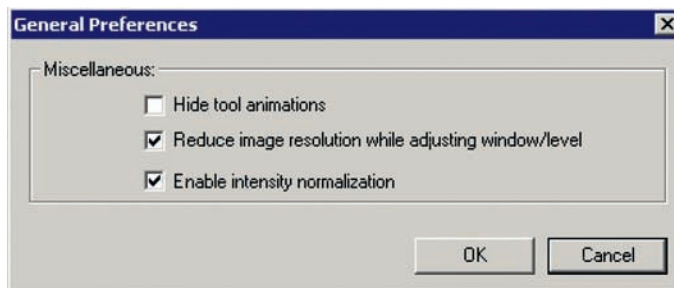
Changing Preferences

You can configure the application to best suit your viewing needs. The following list contains preferences you can set while using the application:

- Show or hide the animation in tool palettes (see “Hiding Animation in Tool Palettes” below);
- Reduce image size when changing the window width/level (see “Configuring the Window/Level Tool” on page 140); and
- Specify whether the application automatically adjusts the window width/level after automatic stitching (see “Specifying Automatic Window Width/Level Adjustment” on page 140).

To open the General Preferences dialog box

- From the File menu, click **General Preferences**.



Hiding Animation in Tool Palettes

The Stitch Tools palette and the Adjustment Tools palette provide animation that show the stitching and adjusting behavior of the option selected in the palette. You can choose to hide this animation so that the palettes do not hinder your view of the images.

For details on using the palettes, see “Accessing the Stitching Palette” on page 149 and “Using the Adjustment Tools Palette” on page 157.

To hide the animation

1. Open the General Preferences dialog box (see “To open the General Preferences dialog box” on page 139).
2. In the Miscellaneous group box, select the “Hide tool animations” checkbox.
3. Click **OK**.

Chapter 18: Configuring the Orthoplan Elite® X-Stitch Module *(continued)*

Configuring the Window/Level Tool

DICOM images are generally large files. You can configure the Window/Level tool to reduce the size (i.e., resolution) of the image while adjusting brightness and contrast in order to resample images faster.



The module only drops the resolution of the image when the Window/ Level tool is active. Once you select a different tool, the image returns to its original resolution.

To configure the Window/Level tool

1. Open the General Preferences dialog box (see “To open the General Preferences dialog box” on page 139).
2. In the Miscellaneous group box, select the “Reduce image resolution while adjusting window/level” checkbox.
3. Click OK.

Specifying Automatic Window Width/Level Adjustment

The automatic window width/level adjustment option is only available for automatic stitching (see “Stitching Images Automatically” on page 155).



By default, the module automatically adjusts the window width/level after automatic stitching.

If you configure the module to automatically adjust the window width/level, the module performs the adjustment once the images are stitched. At that time, you can choose to accept the automatic adjustment, or manually adjust the window width/level before you save the stitched image (see “Using the Adjustment Tools Palette” on page 157).

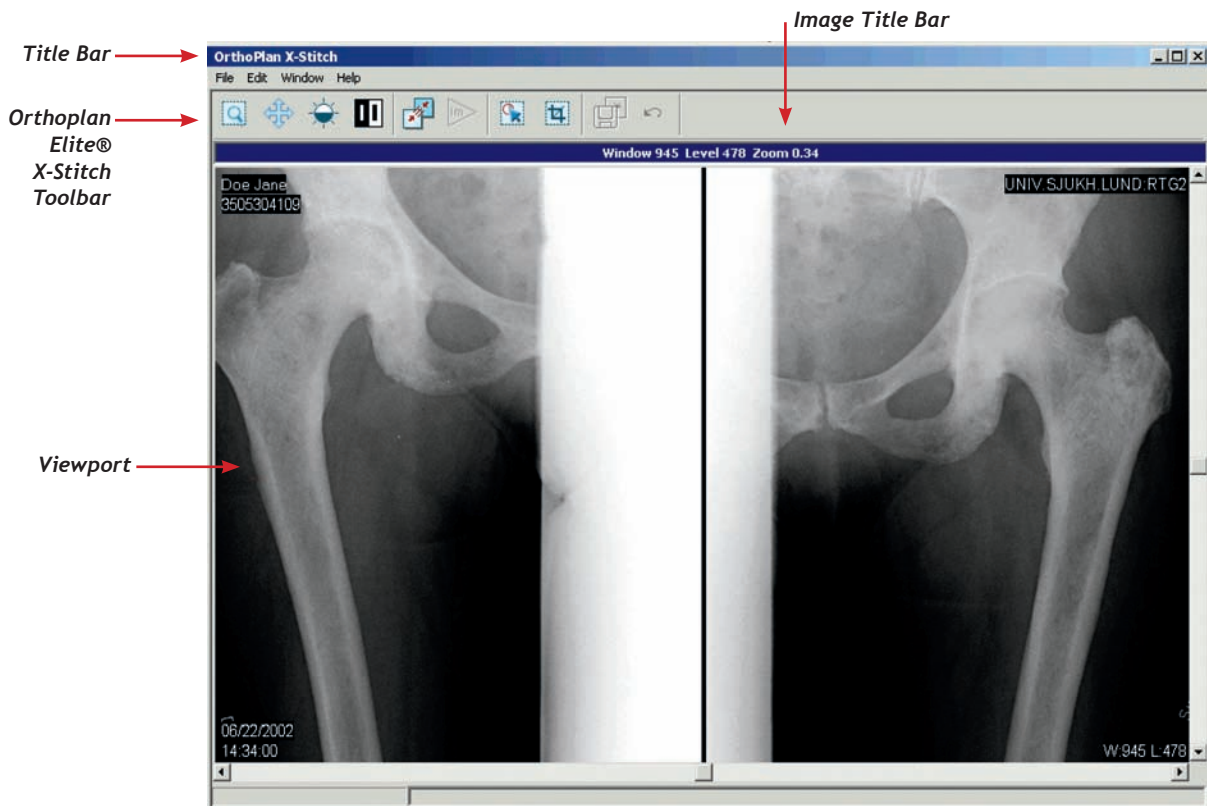
To configure automatic window width/level adjustment

1. Open the General Preferences dialog box (see “To open the General Preferences dialog box” on page 139).
2. In the Miscellaneous group box, do one of the following:
 - Select the “Enable intensity normalization” checkbox to automatically adjust the window width/level after stitching.
 - Clear the “Enable intensity normalization” checkbox to manually adjust the window width/level after stitching.
3. Click OK.

Chapter 19: Using the Sound-Eklin® Orthoplan Elite® X-Stitch Window

Loaded images are displayed in the Sound-Eklin® Orthoplan Elite® X-Stitch window. This chapter describes the components of the Sound-Eklin® Orthoplan Elite® X-Stitch window which consist of the Sound-Eklin® Orthoplan Elite® X-Stitch Toolbar, the popup menu and the keyboard shortcuts.

The Sound-Eklin® Orthoplan Elite® X-Stitch title bar displays the name of the patient and the image title bar displays the current window/level setting and zoom factor.



Chapter 19: Using the Sound-Eklin® Orthoplan Elite® X-Stitch Window *(continued)*

Using the Sound-Eklin® Orthoplan Elite® X-Stitch Toolbar

The Sound-Eklin® Orthoplan Elite® X-Stitch Toolbar provides convenient access to the module's main review tools. As with all Windows applications, you can access the same functions from the main menus in the menu bar or the popup menu. Some of the more frequently used tools are also available using keyboard shortcuts (see "Using Keyboard Shortcuts" on page 143).

You can hide or show the Sound-Eklin® Orthoplan Elite® X-Stitch Toolbar in the Sound-Eklin® Orthoplan Elite® X-Stitch window.

To hide or show the toolbar

1. From the **Window** menu, click **Show Toolbar**.

Using the Popup Menu

As with most Windows applications, you can right-click a window to access a popup menu. The popup menu provides access to review and stitching tools.

To use the popup menu

1. Right-click the desired image in the viewport and select the appropriate option from the popup menu.

Zoom	Z
Pan	A
Window/Level	W
Inverse	B
✓ Overlay	Q
Stitch Tools	T
Next Image	
Adjust Image	J
Crop Image	X
Blending method	►
Auto-stitch Horizontally	H
Auto-stitch Vertically	V
Save	S

Chapter 19: Using the Sound-Eklin® Orthoplan Elite® X-Stitch Window *(continued)*

Using Keyboard Shortcuts

In addition to using the Sound-Eklin® Orthoplan Elite® X-Stitch Toolbar and popup menu to access the module's menu items, you can use keyboard shortcuts described in to access certain functions while in the review window.

This section also describes keyboard shortcuts that are not tied directly to menu items or toolbar icons:

Using General Keyboard Shortcuts

This section describes general keyboard shortcuts and combinations that are available in the Sound-Eklin® Orthoplan Elite® X-Stitch module.

Table 19.1 — Keyboard Shortcuts and Combinations

Command	Description	Keyboard Shortcut and Combination
Adjust Image	Display the Adjustment Tools dialog box.	J
Exit	Close the Sound-Eklin® Orthoplan Elite® X-Stitch module.	ALT+F4
Horizontal Auto-Stitch	Automatically stitch the images horizontally.	H
Inverse	Display the current image with inverse (i.e., negative) values.	B
Overlay Text	Show or hide patient information.	Q
Pan	Reposition the image in the viewport.	A
Print	Image Print the image in the viewport to the system printer.	CTRL+P
Reset Fiducials	Remove any fiducial markers that may have been indicated. R	
Save	Save the stitched image as a DICOM file.	S
Stitch Tools	Display the Stitch Tools dialog box.	T
Vertical Auto-Stitch	Automatically stitch the images vertically.	V
Window/Level	Change the window/level.	W
Zoom	Zoom images.	Z

Chapter 19: Using the Sound-Eklin® Orthoplan Elite® X-Stitch Window *(continued)*

Using Keyboard Shortcuts for Stitching

This section describes the keyboard shortcuts available when you stitch images manually. These keyboard shortcuts allow you to quickly move selected fiducial markers in an image in the viewport.



*You can combine the following keyboard shortcuts with the **SHIFT** key. When you use the **SHIFT** key combination (e.g., **SHIFT+UP-ARROW**), the movement will be increased by a factor of ten.*

Table 19.2 – Stitch Tools Keyboard Shortcut

Command	Description	Keyboard Shortcut
Move up	Move the selected fiducial marker up by one pixel.	UP-ARROW
Move down	Move the selected fiducial marker down by one pixel.	DOWN-ARROW
Move left	Move the selected fiducial marker left by one pixel.	LEFT-ARROW
Move right	Move the selected fiducial marker right by one pixel.	RIGHT-ARROW

Chapter 19: Using the Sound-Eklin® Orthoplan Elite® X-Stitch Window *(continued)*

Using Keyboard Shortcuts for the Adjustment Tool Palette

This section describes the keyboard shortcuts available when you are using the Adjustment Tools palette (see “Using the Adjustment Tools Palette” on page 157). These keyboard shortcuts allow you to quick move high-lighted items in the image in the viewport.



You can combine the following keyboard shortcuts with the SHIFT key. When you use the SHIFT key combination (e.g., SHIFT+UP-ARROW), the movement will be increased by a factor of ten.

Table 19.3 — Stitch Tools Keyboard Shortcut

Command	Description	Keyboard Shortcut
Move up	Moves the highlighted item up by one pixel.	UP-ARROW
Move down	Moves the highlighted item down by one pixel.	DOWN-ARROW
Move left	Moves the highlighted item left by one pixel.	LEFT-ARROW
Move right	Moves the highlighted item right by one pixel.	RIGHT-ARROW
Rotate anti-clockwise	Rotate the image 0.25 degrees anti-clockwise.	PAGE UP
Rotate clockwise	Rotate the image 0.25 degrees clockwise.	PAGE DOWN

Chapter 20: Stitching Images

This chapter describes how to use the tools provided to stitch images together. Depending on the review tool you are using, you can access the tool:

- from the main menus in the Sound-Eklin® Orthoplan Elite® X-Stitch review window;
- from the Sound-Eklin® Orthoplan Elite® X-Stitch Toolbar (see “Using the Sound-Eklin® Orthoplan Elite® X-Stitch Toolbar” on page 142);
- from the popup menu (see “Using the Popup Menu” on page 142; or
- using keyboard shortcuts (see “Using Keyboard Shortcuts” on page 143).



The accuracy and stability of both manual and automatic stitching is dependent on the input images. Both the geometry of the acquisition and the contrast in the images can affect the final stitched image.

Workflow

The following list describes the workflow for stitching images:

1. Use the basic tools (e.g., Zoom, Pan, Window/Level) to prepare your image for stitching (see “Using the Basic Tools” on page 147).
2. If you wish to crop your images, crop them before you stitch the images together (see “Cropping Images” on page 149).
3. Stitch your images together (see “Accessing the Stitching Palette” on page 149).
4. Adjust your image if necessary (see “Using the Adjustment Tools Palette” on page 157).
5. Choose a blending method to smooth the join between the images (see “Blending Images” on page 161).
6. Add another image to the composite, if desired (see “Selecting the Next Image for Stitching” on page 162).
7. Save the stitched image (see “Saving the Composite” on page 162).



If you are not pleased with the results from cropping or stitching images, you can revert back to the original image (see “Reverting to the Original Image” on page 162).

Chapter 20: Stitching Images *(continued)*

Using the Basic Tools

This section describes the basic tools you can use to prepare your image for cropping and stitching. These tools are available at any time.

Zooming Images

The Zoom tool allows you to change the magnification of the image.

To zoom an image

1. Do one of the following:
 - From the **Edit** menu, click **Zoom**.
 - In the Sound-Eklin® Orthoplan Elite® X-Stitch Toolbar, click the **Zoom** button.
 - Press the **Z** key.
2. Click and drag the mouse up to increase the zoom factor, or down to decrease it.

Panning Images

The Pan tool moves the image around from the center to locate the best view of a portion of the image. The Pan tool is often used in conjunction with the Zoom tool to examine a small region of a large image.

To pan an image

1. Do one of the following:
 - From the **Edit** menu, click **Pan**.
 - In the Sound-Eklin® Orthoplan Elite® X-Stitch Toolbar, click the **Pan** button.
 - Press the **A** key.
2. Click and drag mouse to reposition the image.

Chapter 20: Stitching Images *(continued)*

Changing Window/Level

The window settings (i.e., window width and window level) on digital images are similar to the contrast and brightness, respectively, on your computer screen. The window width can be wide (many grays, less contrast) or narrow (fewer grays, more contrast). The window level can be high (dark) or low (bright).

To change the window/level

1. Do one of the following:
 - From the **Edit** menu, click **Window/Level**.
 - In the Sound-Eklin® Orthoplan Elite® X-Stitch Toolbar, click the Window/Level button.
 - Press the W key.
2. Click and drag the mouse over the image to adjust the window/level.
 - Move the mouse up and down to change the window level.
 - Move the mouse left and right to change the window width.

Inverting the Image Grayscale

The Inverse Color tool allows you to display the current image with inverse (i.e., negative) values.

To invert the image grayscale

1. Do one of the following:
 - From the **Edit** menu, click **Inverse**.
 - In Sound-Eklin® Orthoplan Elite® X-Stitch Toolbar, click the **Inverse Color** button.
 - Press the B key.

Showing and Hiding Patient Information

You can show or hide the patient information in your image.

To show or hide patient information

1. Do one of the following:
 - From the **Edit** menu, click **Overlay Text**.
 - Press the Q key.

Chapter 20: Stitching Images *(continued)*

Cropping Images

The Crop tool allows you to reduce the size of an image or remove the border of images. You can crop separate images before you stitch them together, or crop the final stitched image.

To crop images

1. Click the image you want to crop.
2. Do one of the following:
 - From the **Edit** menu, click **Crop Image**.
 - In the Stitching Toolbar, click the **Crop Image** button.
3. A yellow, dotted border appears. Move this border to specify the portion of the image you want to keep. The module deletes anything outside this border.
4. Double-click in the selected area to crop the image.
5. To reset the images to their original state, see “Reverting to the Original Image” on page 162.

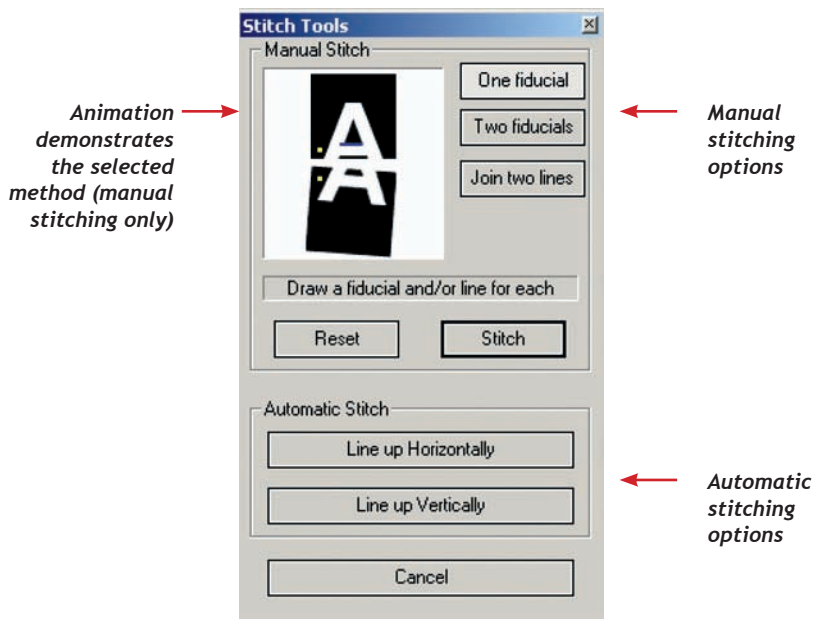


Accessing the Stitching Palette

The Sound-Eklin® Orthoplan Elite® X-Stitch module provides both manual stitching (see “Stitching Images Manually” on page 150) and automatic stitching (see “Stitching Images Automatically” on page 155). Both stitching options are available from the Stitch Tools palette.



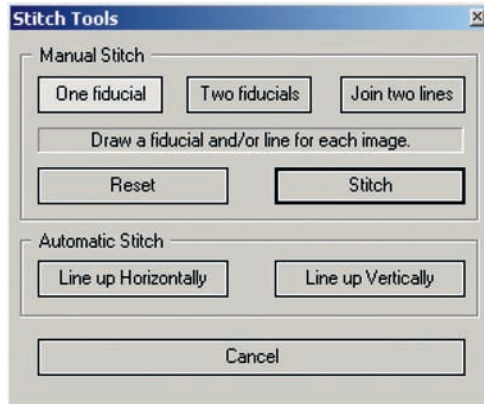
When you have finished stitching, you must close the Stitch Tools to use a different tool palette.



Chapter 20: Stitching Images

Accessing the Stitching Palette (*continued*)

The Stitch Tools palette provides an animation window that demonstrates how the selected manual stitching method works. You can hide the animation in the palette so it doesn't block your view (see "Hiding Animation in Tool Palettes" on page 139). The following is an example of the Stitch Tools palette without the animation window.



To open the stitching palette

1. Do one of the following:
 - From the **Edit** menu, click **Stitch Tools**.
 - In the Sound-Eklin® Orthoplan Elite® X-Stitch Toolbar, click the **Stitch Tools** button.
 - Press the T key.

To close the stitching palette

1. In the Stitch Tools palette, click **Cancel**.

Stitching Images Manually

The Stitch Tools palette provides four methods of manual stitching. When stitching images manually, select a stitching method then stitch two images together. You can stitch images using:

- one fiducial marker (i.e., a single point of reference);
- one fiducial marker and a line;
- two fiducial markers (i.e., two points of reference); or
- two lines.



Although the suggested workflow is to use fiducial markers to align the images, you can join your images by adjusting the placement and rotation of the images (see "Using the Adjustment Tools Palette" on page 157).

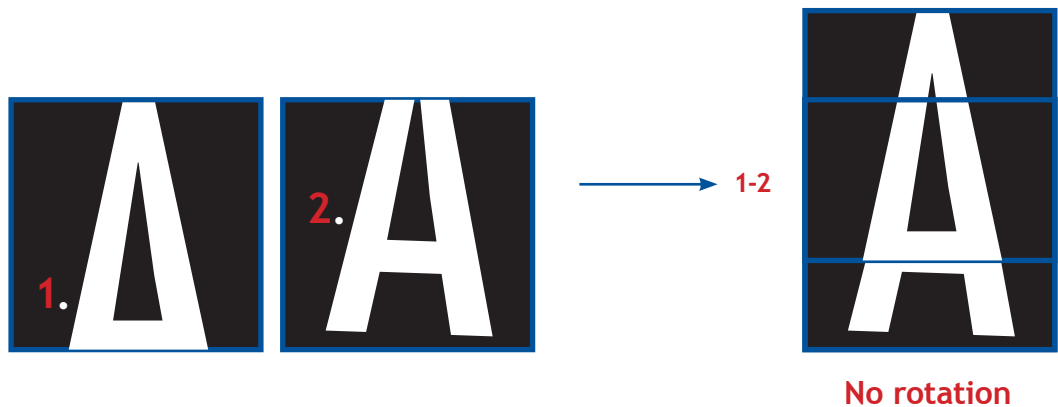
Chapter 20: Stitching Images *(continued)*

Joining Images with One Fiducial Marker

This section describes how to join images using one fiducial marker. Use this method to join two images that have the same orientation (i.e., same angle).

To use one fiducial marker

1. Open the Stitch Tools palette (see “Accessing the Stitching Palette” on page 149).
2. In the Stitch Tools palette, click **One Fiducial**.
3. In the first image, click in the image to indicate a fiducial marker.
4. In the second image, click in the image to indicate a corresponding fiducial marker.
5. You can adjust your fiducial markers before you stitch the images. The viewport displays the active fiducial marker in green, and inactive fiducial markers in red.
6. To adjust your fiducial markers, do one of the following:
 - Click the desired fiducial marker. Press the appropriate arrow key (i.e., LEFT-ARROW, RIGHT-ARROW, UP-ARROW and DOWN-ARROW) to move the fiducial marker by one pixel. To move a fiducial marker by ten pixels, press and hold the SHIFT key, then press the appropriate arrow key.
 - Click and drag the desired fiducial marker to a new location.
7. In the Stitch Tools palette, click **Stitch**. To reset all points and reselect them, click **Reset**.
8. The Sound-Eklin® Orthoplan Elite® X-Stitch module joins points one and two without rotation.



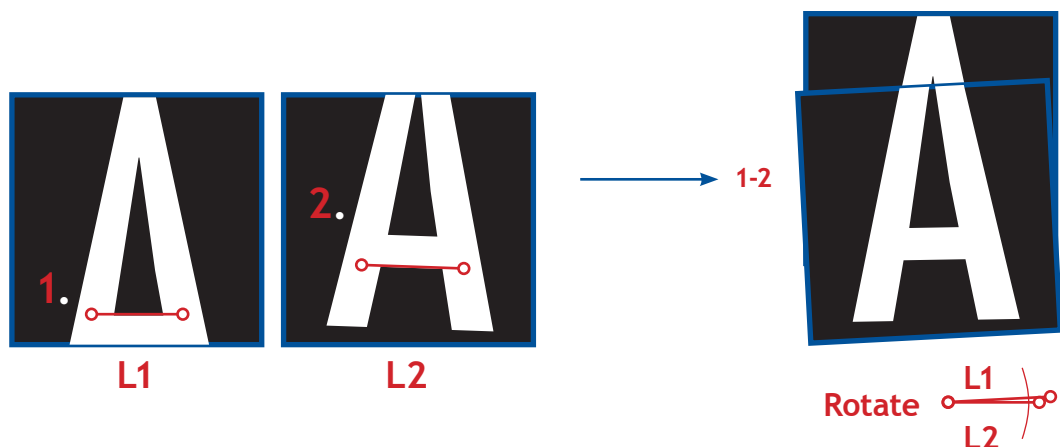
Chapter 20: Stitching Images *(continued)*

Joining Images with One Fiducial Marker and A Line

This section describes how to join images using one fiducial marker and a line. Use this method to join images and rotate them to the same orientation (i.e., same angle). You can also use two fiducial markers to join and rotate images (see “Joining Images with Two Fiducial Markers” on page 153).

To use one fiducial marker and a line

1. Open the Stitch Tools palette (see “Accessing the Stitching Palette” on page 149).
2. In the Stitch Tools palette, click **One fiducial**.
3. In the first image, click in the image to indicate a fiducial marker, then click and drag the mouse to draw a line.
4. In the second image, click in the image to indicate a corresponding fiducial marker. Click and drag the mouse to draw a corresponding line.
5. You can adjust your fiducial markers (i.e., points of reference and end points of lines) before you stitch the images. The viewport displays the active fiducial marker in green, and inactive fiducial markers in red.
6. To adjust your fiducial markers, do one of the following:
 - Click the desired fiducial marker. Press the appropriate arrow key (i.e., LEFT-ARROW, RIGHT-ARROW, UP-ARROW and DOWN-ARROW) to move the fiducial marker by one pixel. To move a fiducial marker by ten pixels, press and hold the SHIFT key, then press the appropriate arrow key.
 - Click and drag the desired fiducial marker to a new location.
7. In the Stitch Tools palette, click **Stitch**. To reset all points and lines, and reselect them, click **Reset**.
8. The Sound-Eklin® Orthoplan Elite® X-Stitch module joins points one and two, then rotates the images so that the lines are parallel.



Chapter 20: Stitching Images (continued)

Joining Images with Two Fiducial Markers

This section describes how to join images using two fiducial markers. Use this method to join images and rotate them to the same orientation (i.e., same angle). You can also use one fiducial marker and a line to join and rotate images (see “Joining Images with One Fiducial Marker & a Line” on page 152).

To use two fiducial markers

1. Open the Stitch Tools palette (see “Accessing the Stitching Palette” on page 149).
2. In the Stitch Tools palette, click **Two fiducials**.
3. In the first image, click in the image to indicate two fiducial marker.
4. In the second image, click in the image to indicate two corresponding fiducial markers.
5. You can adjust your fiducial markers before you stitch the images. The viewport displays the active fiducial marker in green, and inactive fiducial markers in red.
6. To adjust your fiducial markers, do one of the following:
 - Click the desired fiducial marker. Press the appropriate arrow key (i.e., LEFT-ARROW, RIGHT-ARROW, UP-ARROW and DOWN-ARROW) to move the fiducial marker by one pixel. To move a fiducial marker by ten pixels, press and hold the SHIFT key, then press the appropriate arrow key.
 - Click and drag the desired fiducial marker to a new location.
7. In the Stitch Tools palette, click **Stitch**. To reset all points and reselect them, click **Reset**.
8. The Sound-Eklin® Orthoplan Elite® X-Stitch module matches point one with point three, and point two with point four, and rotates the images as necessary.



The module does not change the relative scaling of the two images. If the distance between the two points is not the same in both images, the points may not precisely align with each other (i.e., points 1 and 3, points 2 and 4).



Chapter 20: Stitching Images (continued)

Joining Images with Two Lines

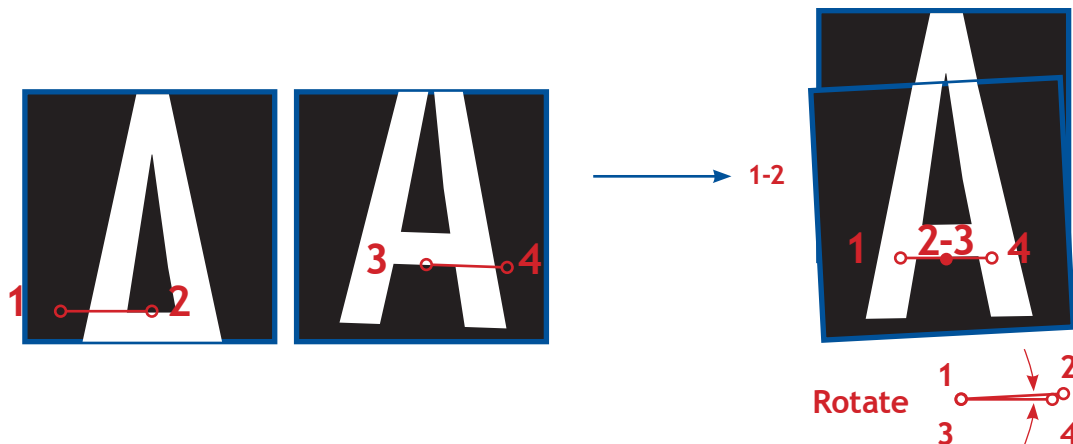
This section describes how to join images using two lines. Use this method to join images and rotate them to the same orientation (i.e., same angle).



This method matches the end of the first line (i.e., line in the first image) with the start of the second line (i.e., line in the second image).

To use two lines

1. Open the Stitch Tools palette (see “Accessing the Stitching Palette” on page 149).
2. In the Stitch Tools palette, click **Join** two lines.
3. In the first image, click and drag the mouse to draw a line.
4. In the second image, click and drag the mouse to draw a corresponding line.
5. You can adjust your fiducial markers (i.e., end points of lines) before you stitch the images. The viewport displays the active fiducial marker in green, and inactive fiducial markers in red.
6. To adjust your fiducial markers, do one of the following:
 - Click the desired fiducial marker. Press the appropriate arrow key (i.e., LEFT-ARROW, RIGHT-ARROW, UP-ARROW and DOWN-ARROW) to move the fiducial marker by one pixel. To move a fiducial marker by ten pixels, press and hold the SHIFT key, then press the appropriate arrow key.
 - Click and drag the desired fiducial marker to a new location.
7. In the Stitch Tools palette, click **Stitch**. To reset all lines and redraw them, click **Reset**.
8. The Sound-Eklin® Orthoplan Elite® X-Stitch module joins the end of the first line with the start of the second, then rotates the images until the lines are parallel.



Chapter 20: Stitching Images *(continued)*

Stitching Images Automatically

The Stitch Tools palette provides four methods of automatic stitching:

- Automatically stitch images that are lined up horizontally.
- Automatically stitch images that are lined up vertically.
- Automatically stitch and adjust images with one fiducial marker.
- Automatically stitch and adjust images with two fiducial markers.



By default, the module automatically adjusts the window width/level after stitching. You can disable this option in the Preferences dialog box (see “Specifying Automatic Window Width/Level Adjustment” on page 140).



If the automatic adjustment is not ideal, you can manually adjust the window width/level before you save the stitched image (see “Using the Adjustment Tools Palette” on page 157). Make sure you adjust the window width/level (if necessary) before you save the stitched image. Once you save the stitched image, you cannot change the window width/level.

Joining Images Horizontally

This section describes how to automatically join two images horizontally. Use this method to join images that are arranged horizontally from left to right.

To automatically stitch images that are lined up horizontally

1. Open the Stitch Tools palette (see “Accessing the Stitching Palette” on page 149).
2. In the Stitch Tools palette, click **Line up Horizontally**.



Instead of using the Stitch Tools palette, you can press the H key to stitch the images horizontally. This keyboard shortcut is available even when the Stitch Tools palette is not open. However, it is not available when another tool (e.g., Crop) or tool palette (e.g., Adjustment Tools palette) is active.

Chapter 20: Stitching Images *(continued)*

Joining Images Vertically

This section describes how to automatically join two images vertically. Use this method to join images that are arranged vertically from top to bottom.

To automatically stitch images that are lined up vertically

1. Open the Stitch Tools palette (see “Accessing the Stitching Palette” on page 149).
2. In the Stitch Tools palette, click **Line up Vertically**.



Instead of using the Stitch Tools palette, you can press the V key to stitch the images vertically. This keyboard shortcut is available even when the Stitch Tools palette is not open. However, it is not available when another tool (e.g., Crop) or tool palette (e.g., Adjustment Tools palette) is active.

Joining & Adjusting Images Using One Fiducial Marker

This section describes how to automatically join and adjust two images using one fiducial marker. Use this method to join two images that have approximately the same orientation (i.e., same angle).



When using this method, the module joins the images as soon as you mark the fiducial markers in both images.

To join and adjust images using one fiducial marker

1. Open the Stitch Tools palette (see “Accessing the Stitching Palette” on page 149).
2. In the first image, click in the image to indicate a fiducial marker. If you are not satisfied with the result, you can click **Reset** fiducials to start over.
3. In the second image, click in the image to indicate a corresponding fiducial marker.
4. The Sound-Eklin® Orthoplan Elite® X-Stitch module joins the two images by aligning the fiducial markers, then automatically adjusts the image to improve the alignment of various features in the images.

Chapter 20: Stitching Images *(continued)*

Joining & Adjusting Images Using Two Fiducial Markers

This section describes how to automatically join and adjust two images using two fiducial markers. Use this method to join two images and rotate them to the same orientation (i.e., same angle).



When using this method, you must indicate all the desired fiducial markers on the first image before marking the second image. The module joins the images as soon as you indicate the location of the fiducial markers in both images.

To join and adjust images using two fiducial markers

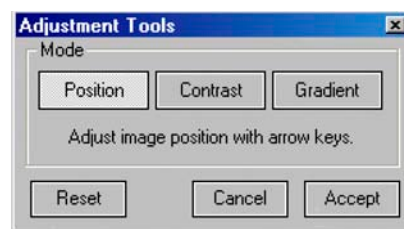
1. Open the Stitch Tools palette (see “Accessing the Stitching Palette” on page 149).
2. In the first image, click in the image to indicate two markers. If you are not satisfied with the result, you can click **Reset** fiducials to start over.
3. In the second image, click in the image to indicate the corresponding fiducial markers. Make sure that you indicate the corresponding markers in the same order as the first image.
4. The Sound-Eklin® Orthoplan Elite® X-Stitch module joins the two images by aligning the fiducial markers, then automatically adjusts the image to improve the alignment of various features in the images.

Using the Adjustment Tools Palette

The Adjustment Tools palette allows you to adjust position, contrast and gradient of the stitched image.



Adjustment Tools palette



*Adjustment Tools palette
without the animation window*

The Adjustment Tools palette provides an animation window that demonstrates how the selected adjustment option works. You can hide the animation in the palette so it does not block your view (see “Hiding Animation in Tool Palettes” on page 139).

When you have finished adjusting the image, you must close the palette to use a different tool palette. You can close the palette in two ways:

- Discard your adjustments and close the palette (see “Cancelling the Changes” on page 161).
- Save your adjustments and close the palette (see “Accepting the Changes” on page 161).

Chapter 20: Stitching Images *(continued)*

Accessing the Adjustment Tools Palette

Use the following procedure to open the Adjustment Tools palette.

To open the Adjustment Tools palette

1. Do one of the following:

- From the **Edit** menu, click **Adjust Image**.
- In the Sound-Eklin® Orthoplan Elite® X-Stitch Toolbar, click the **Adjust Image** button.
- Press the **J** key.



Repositioning the Image

You can adjust the position of the dynamic image (i.e., the image with a green border) so that it lines up with the first image.

To reposition the dynamic image

1. Open the Adjustment Tools palette (see “Accessing the Adjustment Tools Palette” on page 158).
2. In the Adjustment Tools palette, click **Position**.
3. To reposition the image using the keyboard:
 - press the appropriate arrow key (i.e., LEFT-ARROW, RIGHT-ARROW, UP-ARROW and DOWN-ARROW) to move the image by one pixel; or
 - press and hold the SHIFT key, then press the appropriate arrow key to move the image by ten pixels.
4. To reposition the image using the mouse, click inside the green border and drag the image to the new position.

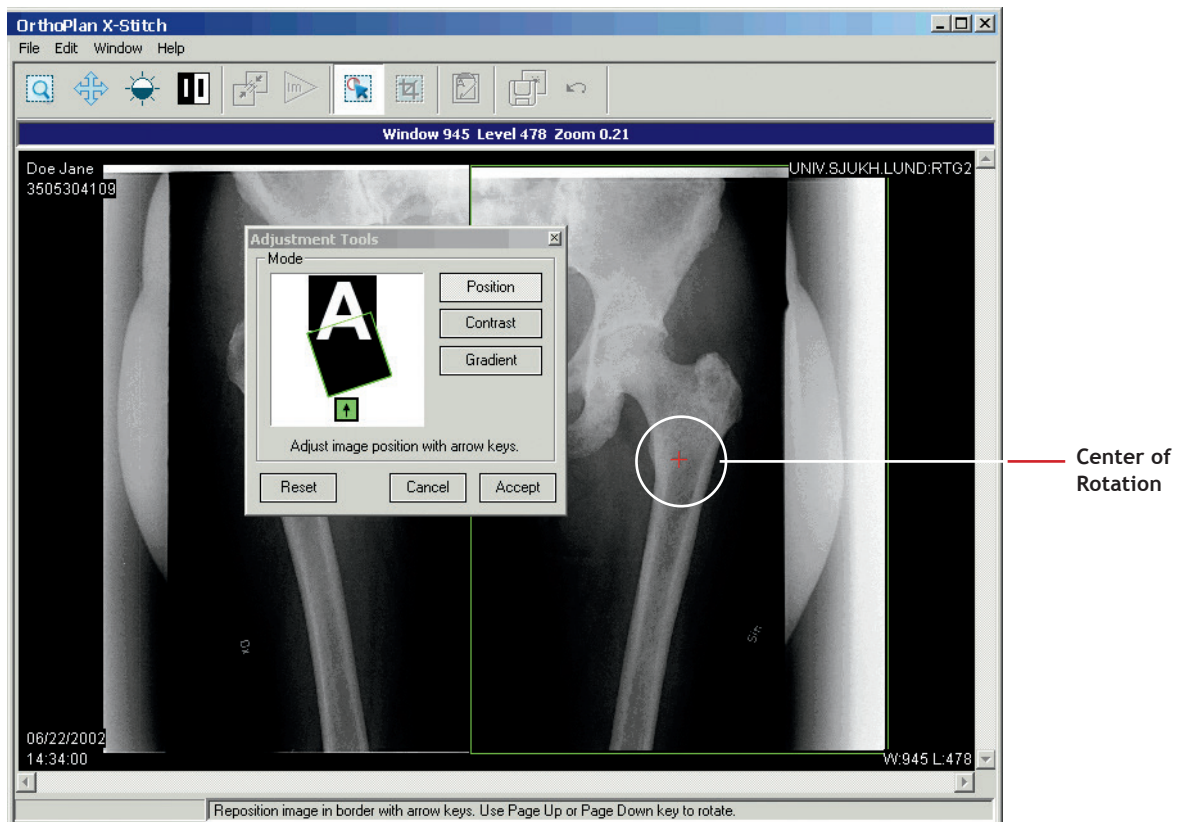
Chapter 20: Stitching Images (*continued*)

Rotating the Image

You can rotate the dynamic image to match the angle of the first image.

To rotate the dynamic image

1. Open the Adjustment Tools palette (see “Accessing the Adjustment Tools Palette” on page 158).
2. In the Adjustment Tools palette, click **Position**.
3. Do the following to rotate the image using the keyboard:
 - Press the PAGE UP key to rotate the image clockwise by 0.25 degree. To rotate the image by 2.5 degrees, press and hold the SHIFT key, and press PAGE UP.
 - Press the PAGE DOWN key to rotate the image anti-clockwise by 0.25 degree. To rotate the image by 2.5 degrees, press and hold the SHIFT key, and press PAGE DOWN.
4. To rotate the image using the mouse, click outside the green border and drag the mouse.
5. Do one of the following to move the center of rotation:
 - Click the center of rotation (i.e., the red cross). When the center of rotation changes from red to green, click and drag it to the new position.
 - Double-click the new position for the center of rotation.



Chapter 20: Stitching Images *(continued)*

Adjusting the Image Contrast

When images have different window/level settings, use the contrast adjustment tool to reduce the differences.

To adjust the contrast of an image

1. Open the Adjustment Tools palette (see “Accessing the Adjustment Tools Palette” on page 158).
2. In the Adjustment Tools palette, click **Contrast**.
3. Adjust the contrast as follows:
 - Click and drag the mouse up and down to adjust the level.
 - Click and drag the mouse left and right to adjust the window settings.



*To adjust the contrast, you must click inside the border of the image.
The image title bar displays the current window/level settings.*

Adjusting the Gradient

You can smoothly adjust the contrast of both images using the Adjustment Tools palette. The gradient feature works in combination with the contrast adjustment. For best results, adjust the image contrast before applying the gradient.

To adjust the gradient

1. Ensure that you have adjusted the image contrast (see “Adjusting the Image Contrast” on page 160).
2. Open the Adjustment Tools palette (see “Accessing the Adjustment Tools Palette” on page 158).
3. In the Adjustment Tools palette, click **Gradient**.
4. Dots appear on the image. These dots represent the gradient range. The default gradient range starts from the center of one image to the center of the other image.
5. To modify the range, click one of the dots and drag it to a new position.

Chapter 20: Stitching Images *(continued)*

Resetting the Parameters

If you are not pleased with the adjustments, you can reset the image back to its original setting (i.e., the point before you started adjusting the image). You can readjust the image from the beginning, if desired.

To reset the adjustment parameters

1. In the Adjustment Tools palette, click **Reset**.

Cancelling the Changes

When you cancel your changes, you are discarding the adjustments made and closing the Adjustment Tools palette.

To cancel your changes

1. In the Adjustment Tools palette, click **Cancel**.
2. The module removes any changes and closes the Adjustment Tools palette.

Accepting the Changes

When you accept the changes, you are saving your adjustments made and closing the Adjustment Tools palette.

To accept your changes

1. In the Adjustment Tools palette, click **Accept**.
2. The module saves your adjustments and closes the Adjustment Tools palette.

Blending Images

To enhance the stitched image quality and flexibility of display, the Sound-Eklin® Orthoplan Elite® X-Stitch module provides five blending methods for overlapped areas between two images.

To select a blending option

1. Select one of the following options from the Edit menu, or the popup menu:
 - **Blend** — Create a smooth transition between two images from 0 to 100%.
 - **Average** — Blend using an averaged value between two images.
 - **MIP** — Blend on a pixel-by-pixel basis by selecting the densest values from the two images).
 - **MinIP** — Blend on a pixel-by-pixel basis by selecting the least dense values from the two images.

Chapter 20: Stitching Images *(continued)*

Selecting the Next Image for Stitching

When you have finished stitching the first two images, you can select the next image to join with the stitched image. The images available for stitching are based on the images loaded into the Sound-Eklin® Orthoplan Elite® X-Stitch module.

To select the next image

1. Do one of the following:
 - From the **Edit** menu, click **Next Image**.
 - In the Sound-Eklin® Orthoplan Elite® X-Stitch Toolbar, click the **Next Image** button.



2. The Sound-Eklin® Orthoplan Elite® X-Stitch window displays the stitched image to your left and the next image to your right.

Saving the Composite

When you have finished stitching your images together, you can save the composite (i.e., stitched) image. The module saves the image in DICOM format.

When you save this image, the Sound-Eklin® Orthoplan Elite® X-Stitch module saves the composite to the Sound-Eklin® ProPlanner database. The module adds the composite image as a series to the patient study.

To save the composite

1. Do one of the following:
 - From the **File** menu, click **Save**.
 - In the Sound-Eklin® Orthoplan Elite® X-Stitch Toolbar, click the **Save** button.
 - Press the **S** key.

Reverting to the Original Image

If you are not pleased with the stitched image, you can revert back to the original images and start over.

To revert to the original image

1. Do one of the following:
 - From the **File** menu, click **Revert**.



- In the Sound-Eklin® Orthoplan Elite® X-Stitch Toolbar, click the **Revert** button.

Chapter 20: Stitching Images *(continued)*

Printing Images

You can send the current image or images in the window to the system printer.

To print the image in the window

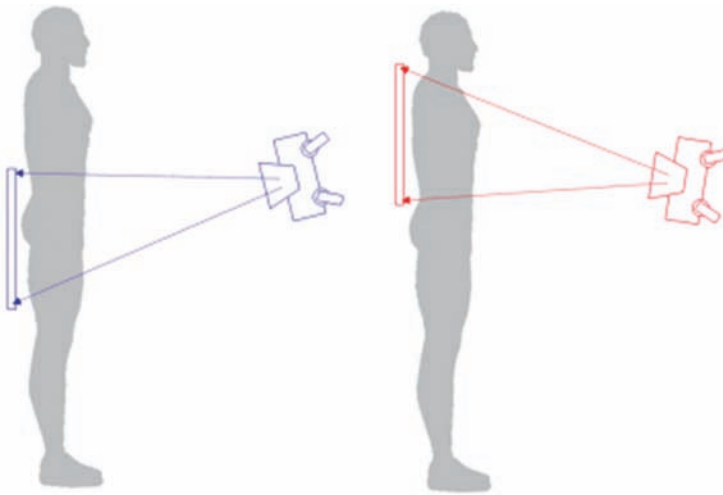
1. Do one of the following:
 - From the File menu, click **Print Image**.
 - Press **CTRL+P**.

Chapter 21: Understanding Input Images

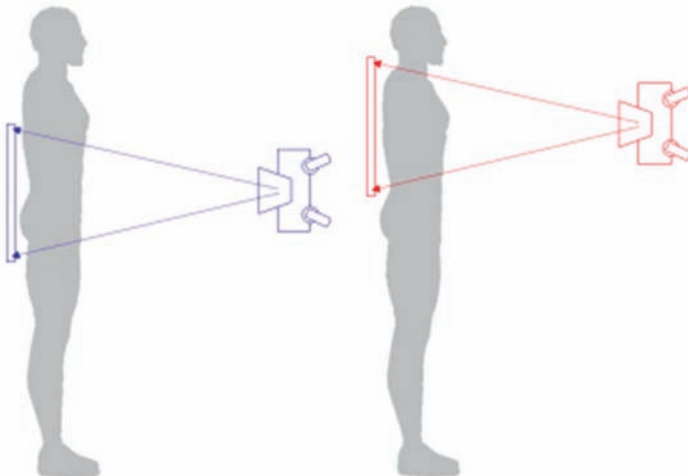
This chapter describes how the input images affect the final stitched image. The accuracy and stability of the stitching procedure is dependant on the input images. The critical elements that affect the final stitched image are the geometry of the acquisition and contrast in the images.

Geometry of the Acquisition

The two acquisition methods used to acquire images for stitching are Stationary Acquisition and Step Acquisition. In Stationary Acquisition, the detector moves while the generator rotates. All the images are effectively acquired with a single point source and parallax is minimal. The following diagram depicts the Stationary Acquisition method.



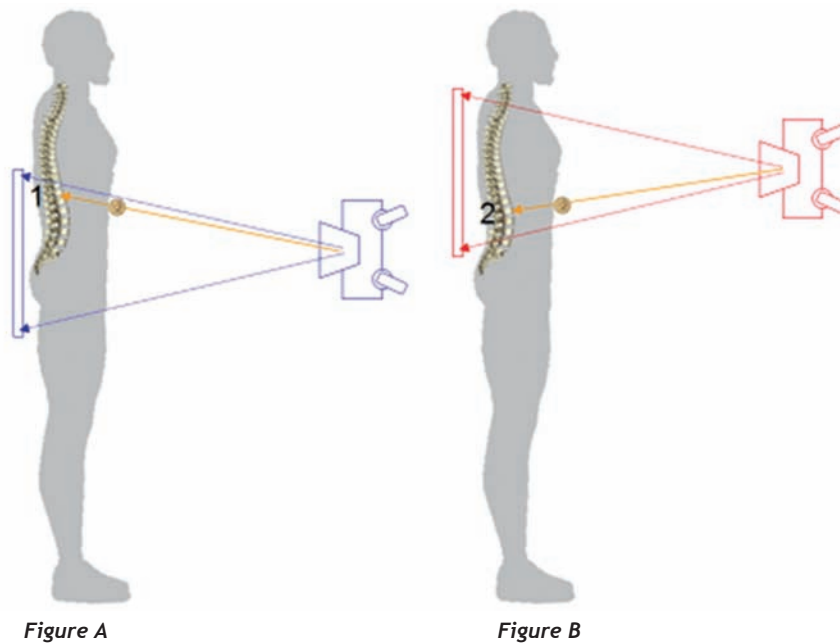
In Step Acquisition, both the detector and the generator are moved when acquiring images. The generator is kept perpendicular to the detector and both the generator and detector move the same distance. Images acquired using this method are affected by parallax (see “Parallax Artifact” on page 165). The following diagram depicts the Step Acquisition method.



Chapter 21: Understanding Input Images *(continued)*

Parallax Artifact

If the generator is moved when acquiring images (i.e., not just rotated), the acquired images are affected by parallax. The structure in the images overlap differently depending on the relative position between the detector and the generator distance. This scenario is shown in the following diagram. In Figure A, the coin on top of the patient is imaged on vertebra one. In Figure B, the generator and detector are moved and the coin is now imaged on vertebra two. In this scenario, it is not possible to create a perfectly stitched image.



The following methods can help minimize the effects of parallax when acquiring images:

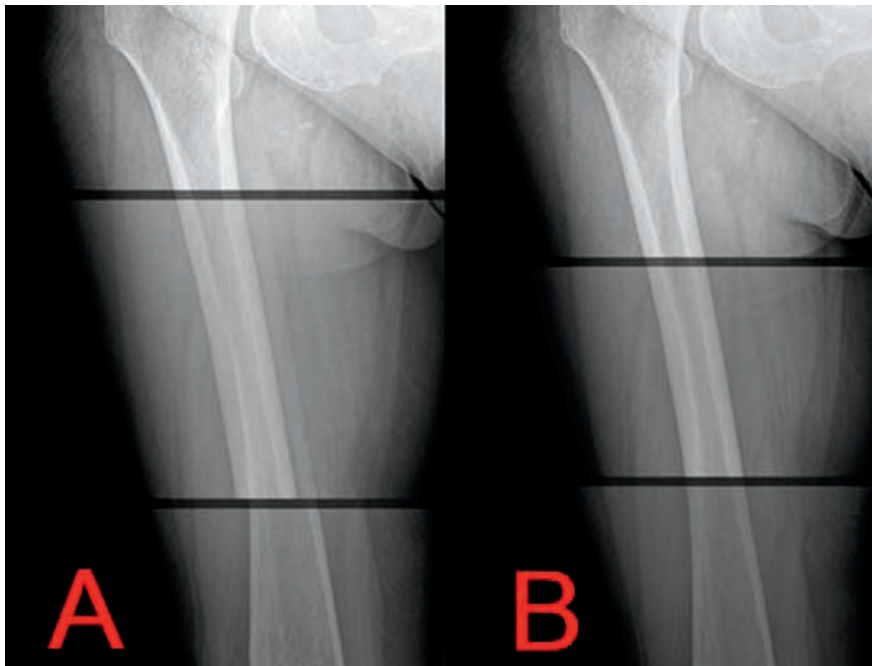
- Increase the distance between the detector and the generator.
- Reduce the field of view of each acquired image by using a collimator. You must acquire more images; however, the patient's dose is not increased as the collimator reduces the surface area exposed during each acquisition. When using a collimator, only the center of each acquired image contains anatomy. In the center, the rays are almost parallel and therefore the parallax minimal.

Chapter 21: Understanding Input Images *(continued)*

Using the Bone Bias Feature

When images affected by parallax are stitched together, not all the structures in the final stitched image are aligned. For example, having the soft tissue align correctly means the bones are not aligned. However, when performing orthopaedic measurements, it is necessary to align the bone rather than the soft tissue.

The Sound-Eklin® Orthoplan Elite® X-Stitch Toolkit provides a Bone Bias feature that facilitates bone alignment. The Bone Bias registration favors the alignment of the bright structures in the image over the alignment of the dark structures. The following images depict the effect of the Bone Bias feature on the stitching procedure. In figure A, the images are stitched normally and the final image is aligned based on the soft tissue. In figure B, the images are stitched using the Bone Bias feature and the final image is aligned based on the bone.



Contrast in the Images

To accurately perform automatic stitching, there must be enough contrast in the overlapping portions of the input images to identify their relative positions. Since an overlapping area at the edge of the image is necessary, some studies may present a significant challenge. For example, a spine study might have the overlapping area in the diaphragm where X-ray penetration is low. A low X-ray penetration area may affect the quality of the stitching if there are no visible anatomical features in the images. In this scenario, a better approach is to set the overlapping area to the lungs, where clearly marked anatomical features exist.

Appendix A: Technical Support

Shipping Address

Sound-Eklin®

6359 Paseo Del Lago

Carlsbad . California 92011

USA

Technical Support

Office hours: Weekdays 8:00 A.M. — 5:00 P.M. Pacific Time

Emergency 24-hour support is available.

Telephone: 760.444.8618, toll-free 800.819.5538

Website

www.soundeklin.com

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